PATENT ASSIGNMENT COVER SHEET

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Stylesheet Version v1.2

EPAS ID: PAT5987899

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
SONGWEI LU	02/08/2012

RECEIVING PARTY DATA

Name:	PPG INDUSTRIES OHIO, INC.
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Street Address:	AV. RICARDO MARGAIN ZOZAYA #400
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State/Country:	MEXICO
Postal Code:	66265
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State/Country:	PENNSYLVANIA
Postal Code:	15024

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	16804146

CORRESPONDENCE DATA

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Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

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ATTORNEY DOCKET NUMBER:	8313-2000901
NAME OF SUBMITTER:	THOMAS C. WOLSKI
SIGNATURE:	/Thomas C. Wolski, Reg No. 55,739/
DATE SIGNED:	02/28/2020

Total Attachments: 58

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ASSIGNMENT

IN CONSIDERATION of good and valuable considerations received from PPG INDUSTRIES OHIO, INC., a corporation of Delaware, having a place of business at Cleveland, Ohio, and intending to be legally bound hereby, we,

NAME	CITY	COUNTY	STATE/COUNTRY
Songwei Lu	Wexford	Allegheny	Pennsylvania

do hereby sell, assign and set over unto PPG INDUSTRIES OHIO, INC., the entire right, title and interest in and to our invention of improvements in

LIGHT EXTRACTING SUBSTRATE FOR ORGANIC LIGHT EMITTING DIODE

as set forth in our application for Letters Patent of the United States of America, U.S. Serial No. 13/364,898, filed February 2, 2012, executed by

Songwei Lu, on the 8 day of February, 2012;

this assignment also includes U.S. Provisional Patent Application Serial No. 61/440,588, filed February 8, 2011; in and for the United States and all foreign countries, the same to be held and enjoyed by PPG INDUSTRIES OHIO, INC., its successors, assigns, or legal representatives, to the full ends of the terms for which all Letters Patent therefor may be granted, as fully and entirely as the same would have been held and enjoyed by us if this assignment and sale had not been made.

AND WE HEREBY AUTHORIZE PPG INDUSTRIES OHIO, INC., to make application for and to receive Letters Patent for said invention in any or all foreign countries in its own name, or in any name, at its election.

AND WE HEREBY COVENANT AND AGREE that we will execute or procure any further necessary assurance of the title to said invention and Letters Patent; and that we will at any time, upon the request and at the expense of PPG INDUSTRIES OHIO, INC., execute and deliver any and all papers that may be necessary or desirable to perfect the title to said invention or any Letters Patent which may be granted therefor, in PPG INDUSTRIES OHIO, INC., its successors, assigns, or other legal representatives, and that we will, at any time, upon the request and at the expense of PPG INDUSTRIES OHIO, INC., testify in any legal proceeding, sign all lawful papers, execute any additional, divisional, continuing or reissue applications for patents for said invention, or any part or parts thereof, make all rightful oaths and generally do all lawful acts to aid PPG INDUSTRIES OHIO, INC., its successors, assigns, or other legal representatives to obtain and enforce patent protection

on said invention in all countries, without further compensation, but at the expense of PPG INDUSTRIES OHIO, INC., its successors, assigns, or other legal representatives.

AND WE HEREBY AUTHORIZE AND REQUEST the Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States for said invention, or resulting from said application, or from any division, reissue, or extension thereof, to PPG INDUSTRIES OHIO, INC., as sole assignee.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals.

Songwei Lu

SONGWEI LU

STATE OF)
) SS
County of)

On this 8 day of February, 2012 appeared before me in person the above Songwei Lu, and acknowledged the above to be his signature, and that he signed, sealed and delivered the above instrument as his voluntary act and deed and for the purposes herein set forth.

Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Gary R. Sobota, Notary Public
City of New Kensington, Westmoreland County
My Commission Expires Jan. 7, 2015
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

PATENT ASSIGNMENT

THIS PATENT ASSIGNMENT (hereinafter, the "Assignment"), made and entered into as of the 1st day of October, 2016 by and between PPG Industries Ohio, Inc., a Delaware corporation having a principal place of business at 3800 West 143rd Street, Cleveland, Ohio, 44111 (hereinafter "PPG"), and Vitro, S.A.B. de C.V., a Mexican corporation having a principal place of business at Av. Ricardo Margain Zozaya #400, Col. Valle del Campestre, San Pedro Garza García, Nuevo León, México 66265 (hereinafter "Company"). Capitalized terms used but not defined herein shall have the meanings given to them in the Sale and Purchase Agreement dated as of July 20, 2016, by and among PPG Industries, Inc., PPG, PPG Canada Inc., Vitro Flat Glass LLC and Company ("Sale and Purchase Agreement").

WHEREAS, PPG is the owner of all right, title, and interest in and to the patents and patent applications appearing on Schedule A hereto (hereinafter the "Patents");

WHEREAS, Vitro Flat Glass LLC has designated Company as a Subsidiary Transferee under the Sale and Purchase Agreement; and

WHEREAS, Company is desirous of acquiring all of PPG's right, title, and interest in and to the Patents pursuant to the terms of the Sale and Purchase Agreement.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, PPG, intending to be legally bound hereby irrevocably sells, contributes, conveys, assigns, transfers, and sets over to Company, its successors, legal representatives and assigns, PPG's entire right, title, and interest in and to the Patents; and all patents which may be granted thereon; and all applications for patents which may hereafter be filed for inventions embodied by said Patents, and all patents which may be granted for said inventions; and all extensions, renewals, continuations, continuations-in-part, reexaminations, foreign counterparts and reissues which may be granted therefrom; together with (A) the right to prosecute, maintain and defend the Patents before any public or private agency, office or registrar including by filing reissues, reexaminations, divisions, continuations, continuations-in-part, substitutes, extensions and all other applications relating to the Patents; (B) all rights of priority based upon the filing of said applications which are created by any law, treaty or international convention; and (C) the full right to sue, including all causes of action (whether known or unknown or whether currently pending, filed, or otherwise) and other enforcement rights for (i) damages, (ii) injunctive relief, (iii) any other remedies of any kind (in each of cases (i), (ii) and (iii) for past, present or future infringement of any of the Patents), (iv) all rights to collect royalties and other payments under or on account of any of the Patents and (v) the right to fully and entirely stand in the place of PPG in all matters related thereto; these rights to be held and enjoyed by Company, its successors and assigns, as fully as the same would have been held and enjoyed by PPG had this assignment not been made; and PPG hereby authorizes and requests the Commissioner for Patents of the United States, and any official of any country or countries foreign to the United States, whose duty is to issue patents on any such applications as aforesaid, to issue all patents for said inventions to Company, its successors, legal representatives and assigns, in accordance with the terms of this instrument.

And for the consideration aforesaid, PPG agrees that it will, upon request, and at Company's sole expense and at no expense to PPG, communicate to Company, its successors, legal representatives and assigns, any material facts known to it respecting said applications, and

testify in any legal proceeding, execute additional lawful papers, make all rightful oaths and generally do everything reasonably necessary to aid Company, its successors, legal representatives and assigns, to obtain and enforce any attendant rights in any and all countries and generally do all other lawful acts reasonable and necessary to give effect to and to record this Assignment. Notwithstanding the foregoing, PPG agrees that it will execute said additional lawful papers at no expense to Company, including to enable Company to record the Assignment herein in any country throughout the world; provided, however that, Company shall bear the expenses associated with the recordation of this Assignment, in any country, including the expenses associated with obtaining any required Apostilles and/or certifications. If PPG fails to promptly take or execute any such action or document after written request by Company, PPG hereby constitutes and appoints Company as true and lawful agent and attorney-in-fact of PPG, with full power of substitution, in the name and stead of PPG but on behalf and for the benefit of Company, to take and execute in the name of PPG any and all actions and documents that may be deemed proper to effect the assignments contemplated in this Assignment.

PPG does hereby covenant that it has the full right to convey its entire interest herein assigned, and that PPG has not executed, and will not execute, any agreement in conflict herewith. This Assignment shall extend to and be binding upon all successors, assigns and licensees of the parties. In the event any provision of this Assignment is declared void or unenforceable by any judicial or administrative authority, this shall not in and of itself nullify the remaining provisions of this Assignment unless the parties mutually decide that such declaration adversely affects the original intent of the parties. This Assignment, along with its Schedule and the Sale and Purchase Agreement and its Schedules and Exhibits, constitutes the entire understanding and agreement of the parties hereto with respect to the subject matter hereof and supersedes all prior and contemporaneous agreements or understandings, inducements or conditions, express or implied, written or oral, between and among the parties with respect hereto. To the extent of any conflict between this Assignment and the Sale and Purchase Agreement with respect to the subject matter herein, the Sale and Purchase Agreement will govern. This Assignment may not be amended unless by writing duly executed by both parties. Any waiver by PPG or Company of a breach of any term or condition of this Assignment shall not be considered as a waiver of any subsequent breach of the same or any other term or condition hereof. This Assignment is effective as of the date set forth in the preamble above (the "Effective Date"). This Assignment may be executed in two (2) or more counterparts, each of which will be deemed an original and all of which together will be considered one agreement. This Assignment shall be governed, including as to validity, interpretation and effect, by, and construed in accordance with, the internal laws of the State of New York applicable to agreements made and fully performed within the State of New York, without reference to its choice of laws principles.

[Signature page follows]

IN WITNESS WHEREOF, each of the parties hereto has caused this Assignment to be executed on its behalf by its duly authorized officers or representatives on the date first above written.

PPG INDUSTRIES OHIO, INC.

By _____
Name: Michael H. McGarry
Title: Authorized Representative
Date:

STATE OF Pennsylvania
COUNTY OF Allegheny

On this 28 day of September 2016, before me, a notary public, the undersigned officer, personally appeared Michael H. McGARRY, known to me (or satisfactorily proven) to be the person whose name is subscribed to the foregoing instrument and acknowledges that he/she executed the same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

_____
Notary Public

[*Signature Lines continue on next page.*]

J. E. GOYKE
COMMONWEALTH OF PENNSYLVANIA
NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Joan E. Goyke, Notary Public
City of Pittsburgh, Allegheny County
My Commission Expires June 18, 2020
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES

NOTARIA PUBLICA No. 25
TITULAR
LIC. OSCAR ELEONICO ALDRETE
MONTERREY N. L. MEXICO
PRIMER DISTRITO

IN WITNESS WHEREOF, each of the parties hereto has caused this Assignment to be executed on its behalf by its duly authorized officers or representatives on the date first above written.

VITRO, S.A.B. de C.V.

By _____
Name: Alberto Hernandez Tellez
Title: Authorized Representative
Date: October 1, 2016

By _____
Name: Ricardo Jose Maiz Rodriguez
Title: VP Strategic Planning & Business Development
Date: October 1, 2016

ACTA NUMERO: 95,374/16 LEVANTADA FUERA DE PROTOCOLO.

EN LA CIUDAD DE MONTERREY, CAPITAL DEL ESTADO DE NUEVO LEÓN, a los 28 (veintiocho) días de septiembre 2016 (dos mil dieciséis), Yo, Licenciado OSCAR ELIZONDO ALONSO, Notario Público, Titular de la Notaría Pública Número (25) veinticinco, con ejercicio la Demarcación Notarial correspondiente al Primer Distrito Registral, con Residencia en este Municipio, HAGO CONSTAR:- Que comparecieron los señores Contador Público ALBERTO HERNANDEZ TELLEZ y Licenciado RICARDO JOSE MAIZ RODRIGUEZ, y Manifestaron que reconocen como suyas y de su puño y letra las firmas con que la calzan en el presente documento, dando por generales las siguientes:- El señor Contador Público ALBERTO HERNÁNDEZ TÉLLEZ, Mexicano, mayor de edad, casado, Profesionista, al corriente en el pago del Impuesto sobre la Renta, con Registro Federal de Contribuyentes Número HETA-691112, y con domicilio convencional en calle Magallanes número 517, Colonia Treviño, en ésta Ciudad, identificándose con Credencial de Elector con Fotografía con número de Folio 081676964, Clave de Elector HRTLAL69111208H501, expedida por el Instituto Federal Electoral.- Y el señor Licenciado RICARDO JOSÉ MAIZ RODRIGUEZ, Mexicano, mayor de edad, de 36 años de edad, casado, originario de ésta Ciudad, habiendo nacido el día 9 de abril de 1976, Profesionista, al corriente en el pago del Impuesto sobre la Renta, y con Registro Federal de Contribuyentes número MARR760409D22, con Clave Única de Registro de Población MARR760409HNLZDC04, y con domicilio en Avenida Ricardo Margain Zozaya número 400, Colonia Valle del Campestre, en San Pedro Garza García, Nuevo León y de paso en ésta Ciudad, identificándose con credencial de Elector con Fotografía, según folio número 0000099211913, clave de Elector MZRDRC76040919H200, expedida por el Instituto Federal Electoral.--- DE LO ANTERIOR QUEDA CONSTANCIA BAJO EL NUMERO (95,374/16) DEL LIBRO DE CONTROL DE ACTAS LEVANTADAS FUERA DE PROTOCOLO QUE OBRA EN ESTA NOTARIA A MI CARGO.- DOY FE.----------

LIC. OSCAR ELIZONDO ALONSO
NOTARIO PÚBLICO TITULAR NUMERO 25
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NOTARIA PUBLICA No. 25
TITULAR
LIC. OSCAR ELIZONDO ALONSO
MONTERREY, N. L., MEXICO
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SCHEDULE A

Schedule A, Part 1 - Active Flat Glass Patents

Case Number	Title	Country	Appl. No.	Filing Date	Publ. No.	Patent No.	Issue Date	Abstract
0510021AA1	MICRO-GROOVED CERAMIC COATER GEOMETRY FOR IMPROVED COATINGS (DW & SUBSTRATE	US	13/572317	02-Oct-2012	US-2013-0081486-A1	8697198	15-Apr-2013	A coating apparatus includes a coater body having a coater geometry to improve coatings on a glass ribbon, and to improve yield of such coatings. The apparatus includes a first arrangement to move the ribbon along a first imaginary straight line through a coating zone provided in a glass forming chamber. The coater has a coating nozzle and an exhaust slot, each have a longitudinal axis. The coating nozzle directs coating vapors toward the coating zone, and the exhaust slot removes vapors from the coating zone. A second arrangement rotates the coater in spaced relation to the ribbon with the coating nozzle and the exhaust slot facing the coating zone. A second imaginary straight line is drawn to the longitudinal axis of the coating nozzle, and the first imaginary line and the second imaginary line subtend an angle in the range of greater than zero degrees to 90 degrees.
0509979US (CC	TCO stack design and process for making same for improved MIS solar cell performance	US	14/963796	09-Dec-2015	US-2016-0260851-A1			An article, for example a solar cell, includes a first substrate having a first surface and a second surface. An undercoat is created over the second surface. A first conductive layer is created over the undercoat. An overlayer is created over the first conductive layer. A semiconductor layer is created over the overlayer. A second conductive layer is created over the semiconductor layer. The first conductive layer can include a conductive oxide such as, least one dopant selected from the group consisting of tungsten, molybdenum, niobium, tantalum, titanium, aluminum, platinum, and molybdenum.
0509979US (CC	TCO stack design and process for making same for improved MIS solar cell performance	US	14/963779	09-Dec-2015	US-2016-0260857-A1			A solar cell includes a first substrate having a first surface and a second surface. An undercoat is created over the second surface. A first conductive layer is created over the undercoat. An overlayer is created over the first conductive layer. A semiconductor layer is created over the overlayer. A second conductive layer is created over the semiconductor layer. The first conductive layer can include a conductive oxide and at least one dopant selected from the group consisting of tungsten, molybdenum, niobium, tantalum, titanium, aluminum, platinum, and molybdenum.
0509979US (CC	TCO stack design and process for making same for improved MIS solar cell performance	US	14/963796	09-Dec-2015	US-2016-0260858-A1			A method of forming a coating layer on a glass substrate in a glass manufacturing process includes: providing a first coating precursor material for a selected coating layer composition to at least one injection nozzle for the selected coating layer; and providing a second coating precursor material for the selected coating layer composition to the injection nozzle to form a selected coating region of the selected coating layer over the first region. The first coating precursor material is different than the second precursor coating material.

Schedule A, Part 1 - Active Flat Glass Patents

Case Number	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
05003793A-ASC	TCO stack design and process for making same for improved MIS solar cell performance	US	14/965832	09-Dec-2015	US-2016-0268453-A1			A method of making a coated article includes forming a first coating over a first surface of a substrate, and forming a second coating over a second surface of the substrate. The second coating includes a first conductive layer including tin oxide and at least one material selected from the group consisting of tungsten, molybdenum, and niobium.
05366/A1	ANTI-COLOR BANDING TOPCOAT FOR COATED ARTICLES	US	13/655685	19-Oct-2012	US-2014-0113120-A1			A coated article includes a functional coating, e.g. an electroconductive low emissivity coating over a surface of a glass substrate and a chemical and/or mechanical protective coating, e.g. a coating of oxides of silicon and aluminum over the functional coating. The protective coating exhibits color banding when viewed under a light source having spectrally non-uniform emissions, e.g. a fluorescent lamp or light emitting diode, and adjacent ones of the color banding of the protective coating have a Delta E of greater than 5. An anti-banding coating layer of the invention is applied over the protective layer, where the anti-banding coating layer exhibits a Delta E of less than 5.
05381SA1	Retainer Clip for Grid Simulating Muntins	US	11/847574	30-Aug-2007	US09-0255254-A1	7954254	07-Jun-2011	A grid simulating muntins is retained or secured by clips within a spacer frame between glass sheets. The clips include a spacer-engaging member having a platform, and upright walls bendable toward one another, and a grid-engaging membe The grid-engaging member is mounted on the platform, extends upward between and spaced from the upright walls, and i received into one of the ends of the elongated members of the grid. The platform and portions of the upright walls of he spacer-engaging member are positioned w hin the spacer frame such that the ends of the elongated members of the grid are below the sight line of the unit. The spacer-engaging member and the grid-engaging member can be a monolithic piece, or the grid-engaging member can be detachably secured to the platform of the spacer-engaging member.
06104G71A1	AQUEOUS SUSPENSION FOR PYROLYTIC SPRAY COATING	US	13/179689	05-Jul-2006	US-2010-0021746-A1	8197930	12-Jun-2012	The durability of a transparent pyrolytic spray applied coating is improved by providing a spray solution of metal acetylacetonates having different particle size distribution. More particularly, the particle size distribution of each of the metal acetylacetonates is a function of its melting temperature, and an inverse of its melting temperature and solubility.
06406P1	METHODS OF MAKING COLORED GLASS BY SURFACE MODIFICATION	US	12/648516	30-Dec-2009	US-2011-0159280-A1			A method of making colored glass in a float glass process includes the steps of: melting glass batch materials in a furnace to form a glass melt; transporting the glass melt into a float glass chamber having a flame spray device, the glass melt forming a float glass ribbon; supplying at least one coating material to the flame spray device to form a spray coating coating particles; and directing the spray onto the float glass ribbon to diffuse the particles into the surface of the float glass ribbon to form a glass sheet of a desired color.
06408SA1	Mullin Grids for Transparencies and Transparencies Having Mullin Grids	US	11/847582	30-Aug-2007	US09-0255265-A1	7748185	06-Jul-2010	A grid simulating muntins for a multi-sheet unit includes a plurality of interconnected vertical and horizontal elongated members. The ends of the elongated members are shaped to engage interior surface of a spacer frame to position the grid within the spacer frame. Shaping the ends of the elongated members eliminates the need for muntin clips.
06412AA1GC	A Device for Use in a Furnace Exhaust Stream for Thermoelectric Generation	US	11/955569	16-Dec-2007	20130084184A1	8461447	11-Jun-2013	A device for generating voltage or electrical current includes an inner elongated member mounted in an outer elongated member, and a plurality of thermoelectric modules mounted in the space between the inner and the outer members. The outer and/or inner elongated members each include a plurality of passages to move a temperature altering medium through the members so that the device can be used in high temperature environments, e.g. the exhaust system of an oxygen fired glass melting furnace. The modules are designed to include a biasing member and/or other arrangements to compensate for differences in thermal expansion between the first and the second members. In this manner, the modules remain in contact with the first and second members. The voltage generated by the modules can be used to power electrical loads.
06412SA1	ELECTROCHROMIC DEVICE	US	12/545410	21-Aug-2009	US-2010-0059722-A1	8085460	27-Dec-2011	An electrochromic device includes a first substrate spaced from a second substrate. A first conductive member is formed over at least a portion of the first substrate. A first electrochromic electrode comprising a tungsten oxide coating is formed over at least a portion of the first conductive member. A second conductive member is formed over at least a portion of the second substrate. A second electrochromic electrode is formed over at least a portion of the second conductive member. An ionic liquid is positioned between the first electrode and the second electrode. In one aspect of the invention, the ionic liquid can include nanoparticles of metals or metal oxides. In a further aspect of the invention, the second conductive member and second electrode can be formed by a single material.
06415SA1	UNDERCOATING LAYERS PROVIDING IMPROVED TOPCOAT FUNCTIONALITY	US	12/273617	19-Nov-2008	US-2010-0255280-A1	7998586	16-Aug-2011	A coated article includes a substrate and a first coating formed over at least a portion of the substrate. The first coating includes a mixture of oxides including oxides of at least two of Fe, Si, Ti, Al and Zr. A functional coating is formed over at least a portion of the first coating. In one embodiment, the functional coating includes fluorine doped tin oxide. In another embodiment, the first layer coating includes titania.

Schedule A, Part 1 - Active Flat Glass Patents

Case Number	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
064155A2	UNDERCOATING LAYERS PROVIDING IMPROVED CONDUCTIVE TOPCOAT FUNCTIONALITY	US	12/273622	19-Nov-2008	US-2010-0124642-A1			A coated article includes a substrate and a first coating formed over at least a portion of the substrate. The first coa includes a mixture of oxides including oxides of at least two of P, Si, Ti, Al and Zr. A conductive functional coating i over at least a portion of the first coating. In one embodiment, the functional coating includes fluorine doped tin oxid
064155A3	UNDERCOATING LAYERS PROVIDING IMPROVED PHOTOACTIVE TOPCOAT FUNCTIONALITY	US	12/273643	19-Nov-2008	US-2010-0124643-A1	8133589	13-Mar-2012	A coated article includes a substrate and a first coating formed over at least a portion of the substrate. The first coa includes a mixture of oxides including oxides of at least two of P, Si, Ti, Al and Zr. A photoactive functional coating i formed over at least a portion of the first coating. In one embodiment, the functional coating includes titania.
064155A2/D1	UNDERCOATING LAYERS PROVIDING IMPROVED PHOTOACTIVE TOPCOAT FUNCTIONALITY	US	13/414866	08-Mar-2012	US-2012-0172209-A1	8685490	01-Apr-2014	A coated article includes a substrate and a first coating formed over at least a portion of the substrate. The first coa includes a mixture of oxides including oxides of at least two of P, Si, Ti, Al and Zr. A photoactive functional coating i formed over at least a portion of the first coating. In one embodiment, the functional coating includes titania.
064165A1GC	Heat Pipes and Use of Heat Pipes in Furnace Exhaust	US	11/958574	18-Dec-2007	0151920	7856849	28-Dec-2010	An array of a plurality of heat pipe are mounted in spaced relationship to one another with the hot end of the heat pi heated environment, e.g. the exhaust flue of a furnace, and the cold end outside the furnace. Heat conversion equi connected to the cold end of the heat pipes.
064250A1GC	Use of Photovoltaics for Waste Heat Recovery	US	12/031393	14-Feb-2008	US-2009-0205711-A1	8420928	16-Apr-2013	A device for recovering waste heat in the form of radiated light, e.g. red visible light and/or infrared light includes a h having a viewing window, and a photovoltaic cell mounted in the housing in a relationship to the viewing window, wh rays of radiated light pass through the viewing window and impinge on surface of the photovoltaic cell. The housing and/or the cell are shaped so that the device can be used with a furnace for an industrial process, e.g. mounting the device with a view of the interior of the heating chamber of a glass making furnace. In this manner, the rays of the radiated light generated during the melting of glass batch materials in the heating chamber pass through the viewing window and impinge on the surface of the photovoltaic cells to generate electric current which is passed onto an electric load.
064369A1	REFLECTIVE ARTICLE	US	12/330680	09-Dec-2008	US-2009-0233071-A1	8497015	30-Jul-2013	A solar mirror includes a highly transparent substrate having a first surface and a second surface. A first reflective coating is formed over at least a portion of the second surface (or, alternatively, the first surface) and includes one or more dielectric layers, such as one or more layers of metal oxides, nitrides, or oxynitrides. A second reflective coating is formed over at least a portion of the second surface (e.g., over the first reflective coating when the first reflective coating is on the second surface) and includes at least one metallic layer. An encapsulation structure is formed over at least a portion of the second reflective coating.
064369A3	REFLECTIVE ARTICLE AND METHOD OF MAKING A REFLECTIVE ARTICLE	US	12/330618	09-Dec-2008	US-2009-0233106-A1	8628820	14-Jan-2014	A solar mirror includes a highly transparent substrate having a first surface and a second surface. A first reflective coating is formed over at least a portion of the second surface (or, alternatively, the first surface) and includes one or more dielectric layers, such as one or more layers of metal oxides, nitrides, or oxynitrides. A second reflective coating is formed over at least a portion of the second surface (e.g., over the first reflective coating when the first reflective coating is on the second surface) and includes at least one metallic layer. An encapsulation structure is formed over at least a portion of the second reflective coating.
064369A3	REFLECTIVE ARTICLE HAVING MULTIPLE REFLECTIVE COATINGS	US	12/330661	09-Dec-2008	US-2009-0233037-A1	8445098	21-May-2013	A solar mirror includes a highly transparent substrate having a first surface and a second surface. A first reflective coating is formed over at least a portion of the second surface (or, alternatively, the first surface) and includes one or more dielectric layers, such as one or more layers of metal oxides, nitrides, or oxynitrides. A second reflective coating is formed over at least a portion of the second surface (e.g., over the first reflective coating when the first reflective coating is on the second surface) and includes at least one metallic layer. An encapsulation structure is formed over at least a portion of the second reflective coating.
064369A3/D1	REFLECTIVE ARTICLE HAVING MULTIPLE REFLECTIVE COATINGS	US	13/764091	11-Feb-2013	US-2013-0155075-A1	9140832	22-Sep-2015	A reflective article, such as a solar mirror, includes a highly transparent substrate having a first major surface and a second major surface. At least one reflective coating is formed over at least a portion of one of the surfaces, e.g., the second major surface (or, alternatively, the first major surface). The reflective coating includes at least one metallic layer. An encapsulation structure can be formed over at least a portion of the second reflective coating.
064561A1	ELECTROMAGNETIC RADIATION SHIELDING DEVICE	US	12/268658	11-Nov-2008	US-2009-0197098-A1	8652659	25-Feb-2014	An electromagnetic radiation shielding device includes a first ply having a No. 1 surface and a No. 2 surface and a second ply having a No. 3 surface and a No. 4 surface. The No. 2 surface of the first ply faces the No. 3 surface of the second ply. A first coating having three or more metallic layers is provided over at least a portion of one of the surfaces, such as over at least a portion of the No. 2 surface. A second coating having three or more metallic layers is provided over at least a portion of one or more of the other surfaces, such as over at least a portion of the No. 3 surface.

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064630A1GC	MULTI-LAYER ELECTRODE FOR HIGH CONTRAST ELECTROCHROMIC DEVICES	US	12/545441	21-Aug-2009	US10-0182671-A1	8049948	01-Nov-2011	An electrochromic device includes a first substrate spaced from a second substrate. A first transparent conductive electrode is formed over at least a portion of the first substrate. A polymeric anode is formed over at least a portion of first conductive electrode. A second transparent conductive electrode is formed over at least a portion of the second substrate. In one aspect of the invention, a multi-layer polymeric cathode is formed over at least a portion of the seco conductive electrode. In one non-limiting embodiment, the multi-layer cathode includes a first cathodically coloring p formed over at least a portion of the second conductive electrode and a second cathodically coloring polymer formed least a portion of the first cathodically coloring polymer. An ionic liquid is positioned between the anode and the cath
064701A1GC	ELECTROCHROMIC DEVICE	US	12/258087	03-Oct-2008	US-2010-0103496-A1	7907322	15-Mar-2011	An electrochromic device includes a first substrate spaced from a second substrate. A first conductive member is fo over at least a portion of the first substrate. A first electrochromic material is formed over at least a portion of the firs conductive member. The first electrochromic material includes an organic material. A second conductive member is formed over at least a portion of the second substrate. A second electrochromic material is formed over at least a po the second conductive member. The second electrochromic material includes an inorganic material. An ionic liquid pos sitioned between the first electrochromic material and the second electrochromic material.
070048404A1	PHOTOVOLTAIC SOLAR CELL WITH HIGH HAZE SUBSTRATE	US	13/677631	16-Nov-2012	US-2013-0333752-A1			A solar cell includes a first substrate having a first surface and a second surface. A haze coating is provided over at ..... portion of the first surface, the haze coating comprising an oxide coating incorporating nanoparticles. A first conductive layer is provided over at least a portion of the second surface. A semiconductor layer is provided over the first conductive layer. A second conductive layer is provided over at least a portion of the semiconductor layer.
070049404A1	SILICON THIN FILM SOLAR CELL HAVING IMPROVED HAZE AND METHODS OF MAKING THE SAME	US	12/543599	21-Dec-2009	US-2011-0146767-A1	9224882	29-Dec-2015	A method of increasing the haze of a coating stack having a top layer and an undercoating layer using a chemical vapor deposition coating process includes at least one of: increasing a precursor flow rate; decreasing a carrier gas flow rate; increasing a substrate temperature; increasing a water flow rate; decreasing an exhaust flow rate; and increasing a thickness of at least one of the top layer or undercoating layer.
070051484A1	SILICON THIN FILM SOLAR CELL HAVING IMPROVED UNDERLAYER COATING	US	12/543448	21-Dec-2009	US-2011-0146768-A1			A silicon thin film solar cell includes a substrate and an undercoating formed over at least a portion of the substrate. The undercoating includes first layer having tin oxide or titania and a second layer having a mixture of oxides of at least two of Sn, F, Si, Ti, Al and Zn. A conductive coating is formed over at least a portion of the first coating, wherein the conductive coating includes oxides of one or more of Zn, Fe, Mn, Al, Ce, Sn, Sb, Hf, Zr, Ni, Zn, Si, Ti, Co, Cr, Si or In or an alloy of two or more of these materials.
070053316A1	SOLAR REFLECTING MIRROR HAVING A PROTECTIVE COATING AND METHOD OF MAKING SAME	US	12/709049	19-Feb-2010	US-2010-0243863-A1			A solar reflecting mirror includes a shaped glass substrate having a focal area, a reflective coating over its convex surface and a sodium ion barrier layer over its concave surface. The shaped substrate has a strain pattern having a radial tension strain at the bottom area, and circumferential compression strain at the periphery of the substrate. As the distance from the periphery of the shaped substrate increases, the circumferential compression strain decreases to a "transition line" where circumferential tension strain begins. As the distance from the transition line in a direction toward the bottom area of the glass substrate increases, the circumferential tension increases. To compensate for the strain pattern in the shaped glass substrate to avoid buckling of, and surface cracks of, the barrier layer, the barrier layer including an oxide of silicon and aluminum thickness, among other things is varied on. A one kind of making the solar mirror from shaped sections is also discussed.
074765A1	METHOD OF REDUCING REDOX RATIO OF MOLTEN GLASS AND THE GLASS MADE THEREBY	US	12/275264	21-Nov-2008	US-2010-0126218-A1	8304358	06-Nov-2012	A soda-lime-silica glass for solar collector cover plates and solar mirrors has less than 0.010 weight percent total iron as Fe2O3, a redox ratio of less than 0.350, less than 0.0025 weight percent CeO2, and spectral properties that include a visible transmission, and a total solar infrared transmittance, of greater than 90% at a thickness of 5.5 millimeters, and reduced solarization. In one non-limiting embodiment of invention, the glass is made by heating a pool of molten soda-lime-silica with a mixture of combustion air and fuel gas having an air firing ratio of greater than 11, or an oxygen firing ratio of greater than 2.31. In another non-limiting embodiment of the invention, streams of oxygen bubbles are moved through a pool of molten glass. In both embodiments, the oxygen oxidizes ferrous iron to ferric iron to reduce the redox ratio.
074766D1	METHOD OF REDUCING REDOX RATIO OF MOLTEN GLASS AND THE GLASS MADE THEREBY	US	13/653613	17-Oct-2012	US-2013-0036940-A1	9133049	15-Sep-2015	A soda-lime-silica glass for solar collector cover plates and solar mirrors has less than 0.010 weight percent total iron as Fe2O3, a redox ratio of less than 0.350, less than 0.0025 weight percent CeO2, and spectral properties that include a visible transmission, and a total solar infrared transmittance, of greater than 90% at a thickness of 5.5 millimeters, and reduced solarization. In one non-limiting embodiment of invention, the glass is made by heating a pool of molten soda-lime-silica with a mixture of combustion air and fuel gas having an air firing ratio of greater than 11, or an oxygen firing ratio of greater than 2.31. In another non-limiting embodiment of the invention, streams of oxygen bubbles are moved through a pool of molten glass. In both embodiments, the oxygen oxidizes ferrous iron to ferric iron to reduce the redox ratio.

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074941A1	REFLECTIVE COATINGS FOR GLASS ARTICLES, METHODS OF DEPOSITION, AND ARTICLES MADE THEREBY	US	12/649745	30-Dec-2009	US-2011-0155685-A1	8541055	24-Sep-2013	The present invention is directed toward a coating apparatus of the invention comprising at least one coating chamber having at least one makeup air conduit in flow communication with the coating chamber via a makeup air pathway connecting the makeup air conduit to the coating chamber. At least one coating member is positioned in the coating chamber. The coating member is in flow communication with a source of coating material including a titanium containing coating material. At least one exhaust member is in flow communication with the coating chamber via an exhaust pathway for removing excess coating and air from the coating chamber.
074975A1	METHOD OF DEPOSITING NIOBIUM DOPED TITANIA FILM ON A SUBSTRATE AND THE COATED SUBSTRATE MADE THEREBY	US	12/767910	27-Apr-2010	US-2011-0262757-A1	8561439	08-Oct-2013	A coated article includes a pyrolytic applied transparent electrically conductive oxide film of niobium doped titanium oxide. The article can be made by using a coating mixture having a niobium precursor and a titanium precursor. The coating mixture is directed toward a heated substrate to decompose the coating mixture and to deposit a transparent electrically conductive niobium doped titanium oxide film on the surface of the heated substrate. In one embodiment of the invention, the method is practiced using a vaporized coating mixture including a vaporized niobium precursor, a vaporized titanium precursor, and a carrier gas to deposit a niobium doped titanium oxide film having a sheet resistance greater than 1.2 and an index of refraction of 2.3 or greater. The chemical formula for the niobium doped titanium oxide is Nb:TiOX where X is the range of 1.8-2.1.
074975P1	METHOD OF DEPOSITING NIOBIUM DOPED TITANIA FILM ON A SUBSTRATE AND THE COATED SUBSTRATE MADE THEREBY	US	14/047324	07-Oct-2013	US-2014-0037866-A1			A coated article includes a pyrolytic applied transparent electrically conductive oxide film of niobium doped titanium oxide. The article can be made by using a coating mixture having a niobium precursor and a titanium precursor. The coating mixture is directed toward a heated substrate to decompose the coating mixture and to deposit a transparent electrically conductive niobium doped titanium oxide film on the surface of the heated substrate. In one embodiment of the invention, the method is practiced using a vaporized coating mixture including a vaporized niobium precursor, a vaporized titanium precursor, and a carrier gas to deposit a niobium doped titanium oxide film having a sheet resistance greater than 1.2 and an index of refraction of 2.3 or greater. The chemical formula for the niobium doped titanium oxide is Nb:TiOX where X is in the range of 1.8-2.1.
075197A1	VEHICLE TRANSPARENCY	US	12/194737	20-Aug-2008	US09-0311005-A1	8025957	27-Sep-2011	A transparency includes a first ply having a first visible light transmission and a second ply having a second visible light transmission, with the first visible light transmission being greater than the second visible light transmission. A solar control coating is located between the first ply and the second ply. The solar control coating has a first infrared reflective metallic layer, a second infrared reflective metallic layer, and a third infrared reflective metallic layer. The first infrared reflective metallic layer is thicker than the second infrared reflective metallic layer and the second infrared reflective metallic layer is thicker than the third infrared reflective metallic layer.
080854A1	SILICON THIN FILM SOLAR CELL HAVING IMPROVED UNDERLAYER COATING	US	13/677681	16-Nov-2012	US-2013-0316140-A1	9062753	14-Jun-2015	A silicon thin film solar cell includes a substrate and an undercoating formed over the substrate. The undercoating includes first layer of tin oxide or titania and a second layer having a mixture of oxides of at least two of Sn, P, Si, Ti, Al, and Zr. A conductive coating is over the first coating. The conductive coating includes oxides of one or more of Zn, Fe, Mn, Al, Co, Sn, Sb, Ni, Zr, Ni, Zn, Bi, Ti, Cu, Cr, Si, or In or an alloy of two or more of these materials. A coated article has a substrate and an anti-iridescent layer formed over the substrate. The anti-iridescent layer has a metal oxide film and a homogeneous mixed oxide film. A functional film is over the anti-iridescent layer.
080868AIGC	ELECTROCURTAIN COATING PROCESS FOR COATING SOLAR MIRRORS	US	12/911189	25-Oct-2010	US-2012-0097546-A1	9057099	16-Oct-2013	An electrically conductive protective coating or film is provided over the surface of a reflective coating of a solar mirror by flowing or directing a cation containing liquid and an anion containing liquid onto the conductive surface. The cation and the anion containing liquids are spaced from, and preferably out of contact with one another on the surface of the reflective coating as an electric current is moved through the anion containing liquid, the conductive surface between the liquids and the cation containing liquid to coat the conductive surface with the electrically conductive coating.
080868A1	HIGH STRAIN POINT GLASS	US	13/687091	28-Nov-2012	US-2014-0144498-A1			The present invention relates to a glass composition that includes: 67 to 75 percent by weight of SiO2; 9 to 11 percent by weight of Al2O3; 6 to 11 percent by weight of Na2O; 16 to 21 percent by weight of CaO; 0.01 to 0.1 percent by weight of Li2O; and less than 0.05 percent by weight of K2O. Each percent by weight is based on total weight of the glass composition. Glass products are also provided that have a bulk glass composition as described above. The glass products, such as flat glass products and glass substrates, have a strain point of at least 580°C and a thermal expansion of at least 7.4 ppm/°C. The present invention also relates to magnetic recording articles and photovoltaic cells that include a glass substrate that has a bulk glass composition as described above.

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09105470A1GC	CORROSION RESISTANT SOLAR MIRROR	US	12/961125	06-Dec-2010	US-2012-0145219-A1	9397230	19-Jul-2016	A reflective article includes a transparent substrate having a first major surface and a second major surface. A base formed over at least a portion of the second major surface. A primary reflective coating having at least one metallic formed over at least a portion of the base coat. A protective coating is formed over at least a portion of the primary reflective coating. The article further includes a solar cell and an anode, with the solar cell connected to the metallic and the anode.
09106508A1	SOLAR CONTROL COATINGS WITH DISCONTINUOUS METAL LAYER	US	13/072686	28-Mar-2011	US-2011-0237415-A1			An architectural transparency includes a substrate, a first dielectric layer formed over at least a portion of the substrate continuous metallic layer formed over at least a portion of the first dielectric layer, a second dielectric layer formed ov least a portion of the first metallic layer, and a subcritical metallic layer formed over at least a portion of the second di layer such that the subcritical metallic layer forms discontinuous metallic regions.
09105764A1GC	ELECTRICAL CONTACT ARRANGEMENT FOR A COATING PROCESS	US	13/015626	28-Jan-2011	US-2012-0193233-A1	8836201	17-Sep-2013	A protective coating is applied to the electrically conductive surface of a reflective coating of a solar mirror by biasing conductive member having a layer of a malleable electrically conductive material, e.g. a paste, against a portion of the conductive surface while moving an electrodepositable coating composition over the conductive surface. The moving electrodepositable coating composition over the conductive surface includes moving the solar mirror through a flow of the electrodepositable coating composition and submerging the solar mirror in a pool of the electrodepositable coating composition. The use of the layer of a malleable electrically conductive material between the conductive member and conductive surface compensates for irregularities in the conductive surface being contacted during the coating process thereby reducing the current density at the electrical contact area.
09105870A1GC	REFLECTIVE ARTICLE HAVING A SACRIFICIAL CATHODIC LAYER	US	13/171509	28-Jun-2011	US-2013-0003206-A1			The present invention relates to reflective articles, such as solar mirrors, that include a sacrificial cathodic layer. The reflective article, more particularly includes a substrate, such as glass, having a multi-layered coating thereon that includes a lead-free sacrificial cathodic layer. The sacrificial cathodic layer includes at least one transition metal, such as a particulate transition metal, which can be in the form of flakes (e.g., zinc flakes). The sacrificial cathodic layer can include an inorganic matrix formed from one or more organic titanates. Alternatively, the sacrificial cathodic layer can include an organic polymer matrix (e.g., a crosslinked organic polymer matrix formed from an organic polymer and an aminoplast crosslinking agent). The reflective article also includes an outer organic polymer coating that can be electrodeposited over the sacrificial cathodic layer.
09106818A1	HIGH HAZE UNDERLAYER FOR SOLAR CELL	US	14/189131	06-Mar-2014	US-2014-0261669-A1			A solar cell has a substrate and an undercoating formed over at least a portion of the substrate. The undercoating includes a continuous first layer of tin oxide and a second layer having oxides of Sn, P, and Si. A transparent conductive coating is formed over at least a portion of the undercoating. The second layer includes protrusions on an upper surface that cause uneven crystal growth of the conductive coating.
09106690A1	DARK PRIVACY GLASS	US	13/033399	14-Feb-2011	US-2012-0207996-A1	8901021	02-Dec-2014	A vehicle roof window includes an uncoated glass transparency having an LTA in the range of greater than 0% to 10%, and a solar factor in the range of equal to or less than 30%, measured at a thickness in the range of 3.6-4.1 millimeters ("mm"), e.g. at a thickness of 3.6 mm, 3.9 mm or 4.1 mm. The solar factor is determined in accordance to International Organization for Standardization ("ISO") No. 13837.
09106961A1	PHOTOVOLTAIC CELL HAVING AN ANTIREFLECTIVE COATING	US	14/200045	07-Mar-2014	US-2014-0251684-A1			The present invention relates to a photovoltaic cell that includes a transparent substrate that has a first surface and a second surface. A transparent conductive oxide coating resides over the second surface of the transparent substrate. A photovoltaic coating resides over the transparent conductive oxide coating. The photovoltaic cell also includes an antireflective coating that resides over the first surface of the transparent substrate. The antireflective coating includes, in order from the first surface of the transparent substrate, a first layer that includes one or more metal oxides, for example, zinc stannate, a second layer that includes one or more metal oxides, for example, silica and aluminum, a third layer that includes one or more metal oxides, for example, zinc stannate and a fourth layer that includes one or more metal oxides, for example, silica.
09107000A1	BLUE GLASS COMPOSITION	US	13/788610	27-May-2010	US-2011-0291496-A1	8440583	14-May-2013	A blue colored, infrared and ultraviolet absorbing glass composition uses a standard soda-lime-silica glass base composition and additionally iron, cobalt, and additional colorants selected from the group of SnO_2, Cr_2O_3, CuO, NiO, TiO2, NM2O3 and combinations thereof. The glass of the present invention has a luminous transmittance of up to 60 percent, a dominant wavelength in the range of 460 to 489 nanometers and an excitation purity of at least 5 percent at a thickness of 0.160 inches (4.06 millimeters). The glass composition can form transparent glass panels that have varying nominal LTA from one another as panel sets for mounting in automobiles.
10007059A1	MIRROR HAVING REFLECTIVE COATINGS ON A FIRST SURFACE AND AN OPPOSITE SECOND SURFACE	US	13/073532	28-Mar-2011	US-2011-0242609-A1	8815402	26-Aug-2014	A solar mirror includes an opaque reflective coating on a surface of a transparent substrate facing away from the sun and a transparent reflective coating on the opposite surface of the substrate. The transparent reflective coating increases the percent reflection of wavelengths in selected ranges, e.g. wavelengths in the infrared range to increase the total solar energy reflected by the solar mirror to increase the solar energy directed to a receiver that converts solar energy to electric and/or thermal energy.

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100070967A1	SOLAR CONTROL COATINGS PROVIDING INCREASED ABSORPTION OR TINT	US	14/204230	11-Mar-2014	US-2014-0272469-A1			A coated article includes a substrate, a first dielectric layer, a substantially metallic layer having discontinuous metallic reg a primer over the substantial layer, and a second dielectric layer over the primer layer. The primer can be a nickel-chrom alloy. The primer can be a multilayer primer having a first layer of a nickel-chromium alloy and a second layer of titaniu
100070985A1	PATTERNS ON GLASS FOR INCREASED LIGHT TRANSMISSION AND/OR LIGHT TRAPPING	US	13/892340	13-May-2013	US-2014-0268391-A1	9188723	17-Nov-2015	In one non-limiting embodiment, a transparency for use as a cover plate for a solar collector, window and/or room divid includes a major surface of a glass substrate having Brewster tetrahedrons to convert unpolarized light waves to polar polarized light waves to reduce the percent of light wave reflectance of the substrate. In such the non-limiting embodimen the transparency includes a major surface of the substrate having pyramidal tetrahedrons to capture light waves within t body of the substrate to reduce the percent of visible light reflection.
100071101A1	A SOLAR REFLECTING MIRROR AND METHOD OF MAKING SAME	US	13/709091	19-Feb-2010	US-2011-0203578-A1	8467124	18-Jun-2013	A solar reflecting mirror having a curved reflective surface includes a plurality of transparent shaped segments held tog by securing facilities to provide a shaped transparent substrate having a convex surface and an opposite concave surfa the concave surface having a focal area. A solar reflecting coating is provided over the convex surface of the shaped substrate to reflect visible and infrared waves of the electromagnetic scale in the focal area of the shaped transparent substrate. A method of making the solar mirror is also disclosed.
100071102A1	COATED GLASSES HAVING A LOW SHEET RESISTANCE, A SMOOTH SURFACE, AND/OR A LOW THERMAL EMISSIVITY	US	13/736316	08-Jan-2013	US-2013-0174892-A1	9463989	11-Oct-2016	A glass sheet has an electrically conductive film having a sheet resistance in the range of 9.5 to 14.0 ohms/square, an emissivity in the range of 0.14 to 0.17 and an absorption coefficient of greater than 1.5 x10(3)cm-1 in the wavelength ran 400-1100 nanometers, and a surface roughness of less than 15 nanometers Root Means Square. A glass sheet of an embodiment of the invention has an electrically conductive film having a phosphorous-fluorine doped tin oxide pyrolytically deposited film on the surface of the glass sheet, wherein the ratio of phosphorous precursor to tin precursor is in the range of greater than 0-0.4. The coated glass sheets of the invention can be used in the manufacture of multi sheet insulating units, OLEDs and solar cells.
100071120A1	COATED GLASSES HAVING A LOW SHEET RESISTANCE, A SMOOTH SURFACE, AND/OR A LOW THERMAL EMISSIVITY	US	15/244409	23-Aug-2016		8158237	10-Jan-2012	A glass sheet has an electrically conductive film having a sheet resistance in the range of 9.5 to 14.0 ohms/square, an emissivity in the range of 0.14 to 0.17 and an absorption coefficient of greater than 1.5 x10(3)cm-1 in the wavelength range of 400-1100 nanometers, and a surface roughness of less than 15 nanometers Root Means Square. A glass sheet of another embodiment of the invention has an electrically conductive film having a phosphorous-fluorine doped tin oxide pyrolytically deposited film on the surface of the glass sheet, wherein the ratio of phosphorous precursor to tin precursor is in the range of greater than 0-0.4. The coated glass sheets of the invention can be used in the manufacture of multi sheet insulating units, OLEDs and solar cells.
100071884A1	TRANSPARENT CONDUCTIVE OXIDE COATINGS FOR ORGANIC LIGHT EMITTING DIODES AND SOLAR DEVICES	US	14/201832	07-Mar-2014	US-2014-0312327-A1	9444068	13-Sep-2016	A transparent conductive oxide (TCO) electrode for an organic light emitting diode (OLED) has a first layer of a crystalline material and a second layer of an amorphous material. The material of the second layer can include one or more dopant materials.
100072239A1	HIGH TRANSMITTANCE GLASS	US	13/223075	31-Aug-2011	US-2012-0058880-A1	8664132	04-Mar-2014	A high transmittance glass includes: SiO2 in the range of 65 to 75 weight percent; Na2O in the range of 10 to 20 weight percent; CaO in the range of 5 to 15 weight percent; MgO in the range of 0 to 5 weight percent; Al2O3 in the range of 0 to 5 weight percent; K2O in the range of 0 to 5 weight percent; MnO2 in the range of 0.035 to 0.6 weight percent; FeO in the range of 0.0010 to 0.0080 weight percent; and Fe2O3 (total iron) in the range of 0.001 to 0.08 weight percent. The glass has a redox ratio in the range of 0.1 to 0.4.
100073774A1	LIGHT EXTRACTING SUBSTRATE FOR ORGANIC LIGHT EMITTING DIODE	US	13/364936	02-Feb-2012	US-2012-0200929-A1			A light extraction substrate includes a glass substrate having a first surface and a second surface. A first light extraction region can be defined on and/or adjacent the first surface. The first light extraction region includes nanoparticles. A second light extraction region can be defined on at least a part of the second surface. The second light extraction region has a surface roughness of at least 10 nm.
100074494A1GC	TRIPLE GLAZED INSULATING UNIT WITH IMPROVED EDGE INSULATION	US	13/629315	21-Sep-2012	US-2014-0087096-A1	9359808	07-Jun-2016	An insulating unit includes a first spacer frame between first and second sheets, e.g. glass sheets, and a second spacer frame between the second sheet and a third sheet. A first surface of the first spacer frame is adhered to inner surface of the first sheet, and an opposite second surface of the first spacer frame is adhered to a first surface of the second sheet, by a moisture impervious adhesive layer. A first outer surface of the second spacer frame is adhered to a second surface of the second sheet, and an opposite second outer surface of the second spacer frame is adhered to an inner surface of the third sheet, by the adhesive layer. The first spacer frame and the second spacer frame have an offset of greater than zero.

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1039D1	CATHODE TARGETS OF SILICON AND TRANSITION METAL	US	08/939176	08-Sep-1997	09/09/2016	6365014B2	02-Apr-2002	Silicon-chromium cathode targets comprising 5 to 80 weight percent chromium are disclosed for sputtering absorbing coatings of silicon-chromium alloy in atmospheres comprising inert gas, reactive gases such as nitrogen, oxygen, and mixtures thereof which may further comprise inert gas, such as argon, to form nitrides, oxides, and oxynitrides as well metallic films. The presence of chromium in the cathode target in the range of 5 to 80 weight percent provides target st and enhanced sputtering rates over targets of silicon alone, comparable to the target stability and sputtering rates of si nickel, not only when sputtering in oxygen to produce an oxide coating, but also when sputtering in inert gas, nitrogen mixture of nitrogen and oxygen to produce coatings of silicon-chromium, silicon-chromium nitride or silicon-chromium oxynitride respectively. The chromium in the target may be replaced in part with nickel, preferably in the range of 5 to 1 weight percent, to produce coatings of silicon-chromium-nickel and the oxides, nitrides and oxynitrides thereof.
1039P4	CATHODE TARGETS OF SILICON AND TRANSITION METAL	US	10/377082	15-Feb-2002	0125150-A1	6793778B2	21-Sep-2004	Silicon-chromium cathode targets comprising 5 to 80 weight percent chromium are disclosed for sputtering absorbing coatings of silicon-chromium-containing material in atmospheres comprising inert gas, reactive gases such as nitrogen oxygen, and mixtures thereof which may further comprise inert gas, such as argon, to form nitrides, oxides, and oxynitr as well as metallic films. The presence of chromium in the cathode target in the range of 5 to 80 weight percent provid target stability and enhanced sputtering rates over targets of silicon alone, comparable to the target stability and sputte rates of silicon-nickel, not only when sputtering in oxygen to produce an oxide coating, but also when sputtering in iner nitrogen or a mixture of nitrogen and oxygen to produce coatings of silicon-chromium, silicon-chromium nitride or silicon-chromium oxynitride respectively. The chromium in the target may be replaced in part with nickel, preferably in the range of 5 to 15 weight percent, to produce coatings of silicon-chromium-nickel and the oxides, nitrides and oxynitrides thereof.
1019O1	GRAY GLASS COMPOSITION	US	08/414165	31-Mar-1995		6114264	05-Sep-2000	The present invention provides a glass composition having a neutral gray color and a luminous (visible) transmittance within a range that allows the glass to be used in the forward vision areas of a vehicle. The base glass is a soda-lime-silica composition and iron, cobalt, selenium and/or nickel are added as colorants. In one particular embodiment of the invention which is essentially nickel-free, a neutral gray colored glass with a luminous transmittance (C.I.E. Illuminant A) of 80% and higher at a thickness of 3.9 millimeters may be attained by using as colorants: 0.30 to 0.70 wt. % Fe2O3, as greater than 0.21 wt. % FeO, 3-50 PPM CoO and 1-15 PPM Se, and preferably 0.32 to 0.65 wt. % Fe2O3, 0.065 to 0.20 wt. % FeO, 5 to 40 PPM CoO and 1 to 8 PPM Se. In an alternate embodiment of the invention which includes nickel oxide as a colorant, a neutral gray colored glass with a luminous transmittance of 80% and higher at a thickness of 3.9 millimeters may be attained by using 0.15 to 0.65 wt. % Fe2O3, as greater than 0.18 wt. % FeO, 15-65 PPM CoO, 0-5 PPM Se and 25-350 PPM NiO as colorants, and preferably 0.17 to 0.60 wt. % Fe2O3, 0.04 to 0.16 wt. % FeO, 20 to 52 PPM CoO, 0 to 3 PPM Se and at least 50 PP
1019P2	COLORED GLASS COMPOSITIONS AND AUTOMOTIVE VISION PANELS WITH REDUCED TRANSMITTED COLOR SHIFT	US	10/373080	21-Feb-2003	0216242A1	7071133B2	04-Jul-2006	A neutral gray colored glass composition for automotive vision panels having reduced transmitted color shift characteristics is provided. The glass composition has a base portion including 65 to 75 weight percent SiO2, 10 to 20 weight percent Na2O, 5 to 15 weight percent CaO, 0 to 5 weight percent MgO, 0 to 5 weight percent Al2O3, and 0 to 5 weight percent K2O. The composition also includes major colorants including 0.30 to 0.75 weight percent Fe2O3, 0 to 15 ppm CoO, and 1 to 15 ppm Se. The glass has a luminous transmittance of at least 85 percent at a thickness of 3.9 mm, a redox ratio of 0.2 to 0.675, a TSET of less than or equal to 85 percent, and a standard color shift of less than 6.
1047D1	WATER REPELLENT SURFACE TREATMENT WITH ACID ACTIVATION	US	08/985554	05-Dec-1997		5980993	09-Nov-1999	The present invention relates to improving the durability of water repellent films and a method for providing the film on a substrate. The water repellent film is preferably formed over the substrate by applying a water repellent composition Over the substrate which will form the water repellent film. The durability of the water repellency of the film is improved by activating the substrate with an acid prior to forming the water repellent film over the substrate.
1047P3	WATER-REPELLENT SURFACE TREATMENT	US	09/095200	10-Jun-1998		6025025	15-Feb-2001	The present invention relates to a method of improving the durability of wat er- repellent films deposited on the surface of a substrate and to a coated article having water-repellent film of improved durability deposited on the substrate surface. The me thod includes the steps of simultaneously abrasive y and chemically preparing the surface to expose an increased number of bonding sites on the substrate surface by applying a dispersion including an acid solution and an abrasive material to the surface. The dispersion is hen removed and the water-repellent film is formed over the prepared surface. Th e bonding sites result with the water-repellent film to more effectively bond t he film to the substrate and thereby improve the durability of the water- repellent film. The abrading material is preferably selected from the group consisting of alumina, ceria, iron oxide, garnet, zirconia, silica, silicon carbide, cubonic oxide, pumice and diamond, and the acid solution is preferably selected from the group consis ng of solutions of hydrochloric acid, sulfuric acid, tartaric acid, phosphoric acid, hydrofluoric acid, nitr c acid, acetic acid, trifluoroacetic acid, oxalic acid and citric acid.</SUBDAB >

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11107895A1	SOLAR CELL WITH SELECTIVELY DOPED CONDUCTIVE OXIDE LAYER AND METHOD OF MAKING THE SAME	US	14/200443	07-Mar-2014	US-2014-0311578-A1			A method of making a coated substrate having a transparent conductive oxide layer with a dopant selectively distributed therein includes selectively supplying an oxide precursor material and a dopant precursor material to each coating zone of a multi-cell chemical vapor deposition coater, wherein the amount of dopant material supplied is selected to vary the dopant content versus coating depth in the resultant coating.
11106083A1	THERMOCHROMIC GLAZINGS	US	14/203049	11-Mar-2014	US-2014-0268291-A1	9075253	07-Jul-2015	A thermochromic window system includes at least one substrate and a thermochromic layer deposited onto the at least one substrate. The thermochromic layer includes at least two thermochromic films and at least one non-thermochromic film positioned between the thermochromic films. The at least one substrate can be selected from glass, plastic, or a combination thereof. The at least one non-thermochromic colored film can also include light absorbers.
11106133A1GO	ORGANIC LIGHT EMITTING DIODE WITH LIGHT EXTRACTING LAYER	US	14/198989	06-Mar-2014	US-2014-0264416-A1	9366787	14-Jun-2016	A light extraction substrate includes a glass substrate having a first surface and a second surface. A light extraction layer is formed on the first surface. The light extraction layer includes an organic/inorganic coating material incorporating nanoparticles.
1149D1	COATED ARTICLES	US	09/159490	09-Oct-1998		6579627B1	17-Jun-2003	Multilayer high transmittance, low emissivity coatings on transparent substrates feature a specific arrangement of at least two parts on the substrate-near side of a metallic, reflective film. A first of the two parts is in contact with the film. This first film-part has crystalline properties for causing the metallic film to deposit in a low resistivity configuration. A second of the two film-parts supports the first part and is preferably amorphous. Coated articles of the invention also in combination with the above-mentioned base film or independently thereof, a newly discovered, particularly advantageous range of thicker primer films for coated glass that can be thermally processed for tempering, heat strengthening, or bending.
1149P1	COATED ARTICLES	US	08/023746	19-Feb-1998		5942338	24-Aug-1999	Multilayer high transmittance, low emissivity coatings deposited over transparent substrates have improved mechanical durability, e.g. scratch resistance by the inclusion of at least one mechanical durability enhancing layer (hereinafter "MDE layer"). The MDE layer includes one or more pairs of a zinc oxide sublayer having deposited thereover a sublayer of an oxide of zinc and tin. In one embodiment of the present invention, the MDE layer is composed of two sublayers which includes a first sublayer of an oxide of zinc having deposited thereover a second sublayer of an oxide of zinc and tin. In another embodiment of the invention, the MDE layer is composed of four sublayers which includes a first sublayer of an oxide of zinc, having deposited thereover a second sublayer of an oxide of zinc and tin, having deposited thereover a third sublayer of an oxide of zinc, having deposited thereover a fourth sublayer of an oxide of zinc and tin. Coated articles having the MDE layer of the invention can be thermally processed for tempering, heat strengthening, annealing or bending without haze formation and can be manipulated prior to such thermal processing with little or no surface scratching appearing after such thermal processing.
1170P1	GREEN PRIVACY GLASS	US	09/389840	03-Sep-1999		6413893B1	02-Jul-2002	The present invention provides a green colored, infrared and ultraviolet absorbing glass article having a luminous transmittance of up to 90 percent. The composition of the glass article uses a standard soda-lime-silica glass base composition and additionally iron, cobalt, selenium, and chromium, and titanium, as infrared and ultraviolet radiation absorbing materials and colorants. The glasses of the present invention have a color characterized by a dominant wavelength in the range of about 480 to 565 nanometers, preferably about 496 to 560 nanometers, with an excitation purity of no higher than about 20 percent, preferably no higher than about 10 percent, and more preferably no higher than about 7 percent. The glass compositions may be provided with different levels of spectral performance depending on the particular application and desired luminous transmittance. In one embodiment of the invention, the green colored glass composition in addition to the soda-lime-silica glass base composition has the solar radiation absorbing and colorant portion of about 0.60 to 4 percent by weight total iron, about 0.13 to 0.9 percent by weight Fe_2O_3, about 46 to 500 PPM CoO, about 5 to 70 PPM Se, about 15 to 800 PPM Cr_2O_3, and about 0.02 to 1 percent by weight TiO2. In another embodiment of the invention, the glass composition of the article includes a solar radiation absorbing and colorant portion of 1 to less than 1.4 percent by weight total iron, about 0.3 to 0.8 percent by weight Fe_2O_3, greater than 200 to about 500 PPM CoO, about 5 to 70 PPM Se, greater than 200 to about 800 PPM Cr_2O_3, and 0 to about 1 percent by weight TiO2.

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1165A1	SPACER FRAME FOR AN INSULATING UNIT HAVING STRENGTHENED SIDEWALLS TO RESIST TORSIONAL TWIST	US	06/216481	29-Aug-1988		5813191	29-Sep-1998	An insulating unit having low thermal conducting marginal edge portions includes a pair of glass sheets maintained in a fixed spaced relationship by an edge assembly. The edge assembly includes a spacer frame having a moisture impervious adhesive sealant on outer surfaces of each of the outer legs and base interconnecting the outer legs. The spacer frame is made by joining sections of spacer stock or bending a continuous section of spacer stock. The spacer stock has a pair of outer legs joined by the base to provide the spacer stock with a generally U-shaped cross section. The outer legs are formed e.g. each leg has a pair of members having a bellpin cross section to reduce the degree of torsional twist of the spacer stock and/or spacer frame with the legs preferably only connected by the base having only one thermal conductive path e.g. through the base from one leg to the other leg. In practice, the spacer frame is used to fabricate the unit by securing a glass sheet to each of the outer legs with the moisture impervious adhesive sealant.
1165R1	SPACER FRAME FOR AN INSULATING UNIT HAVING STRENGTHENED SIDEWALLS TO RESIST TORSIONAL TWIST	US	09/399545	20-Sep-1999		RE43593	24-Jul-2012	A spacer stock has a pair of outer legs joined by a base to provide the spacer stock with a generally U shaped cross section. The outer legs are formed e.g. each leg has a pair of members having a bellpin cross section to reduce the deg of torsional twist of the spacer stock and/or spacer frame with the legs preferably only connected by the base having only one thermal conducting path e.g. through the base from one leg to the other leg. The spacer stock may be shaped or sections of spacer stock joined to provide a spacer frame. The spacer frame may be used to fabricate a multi-sheet gla unit e.g. by securing a sheet to each of the outer legs with moisture impervious adhesive or sealant.
1300834AIGC	ORGANIC LIGHT EMITTING DIODE WITH LIGHT EXTRACTING ELECTRODE	US	14/518773	21-Oct-2014	US-2015-0188089-A1			An organic light emitting diode (10) includes a substrate (20), a first electrode (12), an emissive ae lve stack (14), and a second electrode (16). At least one of the first and second electrodes (12, 16) is a light extracting electrode (36) having a metallic layer (38). The metallic layer (38) includes light scattering features (29) on and/or in the metallic layer (38). The light extracting features (29) increase light extraction from the organic light emitting diode (10).
1300847AIGC	ORGANIC LIGHT EMITTING DIODE WITH LIGHT SCATTERING SURFACE	US	14/686548	16-Apr-2015	US-2015-0311474-A1			An organic light emitting diode includes a substrate having a first surface and a second surface, a first electrode, and a second electrode. An emissive layer is located between the first electrode and the second electrode. The diode further includes a surface modification layer, wherein the surface modification layer includes a non-planar surface.
1200699A1	TEMPERED AND NON-TEMPERED GLASS COATINGS HAVING SIMILAR OPTICAL CHARACTERISTICS	US	14/204392	11-Mar-2014	US-2014-0193616-A1	9885325	21-Oct-2014	Temperable and non-temperable coatings are provided which have similar optical characteristics. The non-temperable coating is placed on glass that is not to be tempered and provides certain optical characteristics. The temperable coating is placed on a glass substrate and the coated substrate is then tempered. After tempering, the coated tempered glass sheet and the coated non-tempered glass sheet have similar optical characteristics. Both coatings have a plurality of metal layers, with at least one of the metallic layers being a discontinuous layer with a primer layer over the discontinuous metal layer. For the non-temperable coating, the discontinuous metal layer has an effective thickness in the range of 1.5 nm to 1.7 nm. For the temperable coating, the discontinuous metal layer has an effective thickness in the range of 1.7 nm to 1.9 nm. The primer layer of the temperable coating is thinner than the primer layer of the non-temperable coating.
1210634S01	TEMPERED AND NON-TEMPERED GLASS COATINGS HAVING SIMILAR OPTICAL CHARACTERISTICS	US	14/518286	21-Oct-2014	US-2015-0191393-A1			Temperable and non-temperable coatings are provided which have similar optical characteristics. The non-temperable coating is placed on glass that is not to be tempered and provides certain optical characteristics. The temperable coating is placed on a glass substrate and the coated substrate is then tempered. After tempering, the coated tempered glass sheet and the coated non-tempered glass sheet have similar optical characteristics. Both coatings have a plurality of metal layers, with at least one of the metallic layers being a discontinuous layer with a primer layer over the discontinuous metal layer. For the non-temperable coating, the discontinuous metal layer has an effective thickness in the range of 1.5 nm to 1.7 nm. For the temperable coating, the discontinuous metal layer has an effective thickness in the range of 1.7 nm to 1.9 nm. The primer layer of the temperable coating is thinner than the primer layer of the non-temperable coating.
1200855A1	SOLAR MODULE FRAME	US	14/017449	04-Sep-2013	US-2014-0060625-A1			A framed solar module includes a solar module having solar cells between a pair of sheets. The solar module is mounted in a frame, preferably a closed frame having a continuous base, and V-shaped cut outs or partially V-shaped in the upright legs where corners of the solar module are expected. A layer of a pliable moisture resistant sealant is provided between inner surface of the frame and the peripheral edge, and the marginal edge portions, of the solar module. A spacer, e.g. but not limited to a plurality of spaced protuberances formed on the inner surface of the closed frame engage the outer surface of the solar module to provide the layer with a uniform thickness between the frame and the solar module.

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12008565A1	SYSTEM AND METHOD FOR VISUALIZING AN OBJECT IN A SIMULATED ENVIRONMENT	US	13/572065	10-Aug-2012	US-2014-0043321-A1	9076247	07-Jul-2015	A computer-implemented method for visualizing an object includes the steps of providing a simulated environment rendering, with at least one processor, at least one virtual object based at least partially on the simulated environme viewable angle of the at least one virtual object, and object characteristics associated with the at least one virtual obj object characteristics comprising at least one of the following: reflectance, transmittance, attenuation, or any combin thereof; and changing a viewable angle of the at least one virtual object in response to user input. A system and a c program product for implementing the aforementioned method includes appropriately communicatively connected ha components.
12008565C1	SYSTEM AND METHOD FOR VISUALIZING AN OBJECT IN A SIMULATED ENVIRONMENT	US	14/725599	29-May-2015	US-2015-0346754-A1			A computer-implemented method for visualizing an object includes the steps of providing a simulated environment rendering, with at least one processor, at least one virtual object based at least partially on the simulated environme viewable angle of the at least one virtual object, and object characteristics associated with the at least one virtual obj object characteristics comprising at least one of the following: reflectance, transmittance, attenuation, or any combin thereof; and changing a viewable angle of the at least one virtual object in response to user input. A system and a c program product for implementing the aforementioned method includes appropriately communicatively connected ha components.
12008743A1	GLASS MANUFACTURING SYSTEM INCORPORATING AN OPTICAL LOW-COHERENCE INTERFEROMETRY ASSEMBLY	US	14/314298	25-Jun-2014	US-2015-0376048-A1			A float glass system (10) includes a float bath (14) having a pool of molten metal (16). A chemical vapor deposition (32) is located in the float bath (14) above the pool of molten metal (16). The coater (32) includes at least one low-coherence interferometry probe (38) located in or on the coater (32) and connected to a low-coherence interferomet system (39). Another low-coherence interferometry probe 138 can be located outside an exit end of the float bath (1 connected to the same or another low-coherence interferometry system (39).
12008881A1	On-line particle embedment in glass	US	14/967929	14-Dec-2015				A float bath coating system includes at least one nanoparticle coater located in a float bath. The at least one nanoparticle coater includes a housing, a nanoparticle discharge slot, a first combustion slot, and a second combustion slot. The nanoparticle discharge slot is connected to a nanoparticle source and a carrier fluid source. The first combustion slot is connected to a fuel source and an oxidizer source. The second combustion slot is connected to a fuel source and an oxidizer source.
12008881A2	On-line particle embedment in glass	US	14/967981	14-Dec-2015				A nanoparticle coater includes a housing, a nanoparticle discharge slot, a first combustion slot, and a second combustion slot.
12008881A3	On-line particle embedment in glass	US	14/968011	14-Dec-2015				A glass article includes a glass substrate having a first surface, a second surface, and an edge. At least one nanoparticle coating is located adjacent at least one of the first surface and the second surface.
12008881A4	On-line particle embedment in glass	US	14/968039	14-Dec-2015				A glass drawdown coating system includes a container defining a glass ribbon path having a first side and a second side. At least one nanoparticle coater is located adjacent the first side and/or the second side of the glass ribbon pa h.
12008881V1	On-line particle embedment in glass	US	62/266099	11-Dec-2015				A float glass system includes a float bath; at least one nanoparticle coater located in the float bath; and at least one vapor deposition coater located in the float bath downstream of the nanoparticle coater.
12008980A1GC	SOLAR MIRRORS AND METHODS OF MAKING SOLAR MIRRORS HAVING IMPROVED PROPERTIES	US	15/209778	13-Jul-2016				A solar reflective mirror includes a parting film between solar reflecting substrate to improve optics and stability of the solar mirror. The coating stack of the solar reflector mirror is encapsulated to increase the useable life of the solar mirror, and to eliminate the need for a permanent protective overcoat. Omission of the PPO film which is electrically non-conductive makes the coating stack electrically conductive eliminating the need for a two layer encapsulant when the encapsulant is e-coated. Another feature of the invention is applying the base coat of the encapsulant over the marginal edges of the PPO film leaving a center section without coverage and adding the top coating of the encapsulant over the base coat and the uncoated area.
12008983D1	LOW IRON, HIGH REDOX RATIO, AND HIGH IRON, HIGH REDOX RATIO, SODA-LIME-SILICA GLASSES AND METHODS OF MAKING SAME	US	15/048936	18-Feb-2016	US-2016-0159680-A1			A glass has a basic soda-lime-silica glass portion, and a colorant portion including total iron as Fe2O3 in the range of greater than zero to 0.10 weight percent, e.g. selected from the group of total iron as Fe2O3 in the range of greater than zero to 0.02 weight percent and total iron as Fe2O3 in the range of greater than 0.02 weight percent to less than 0.10 weight percent, redox ratio in the range of 0.2 to 0.9, and tin and/or tin compounds, e.g. SnO2 greater than 0.000 to 5.0 weight percent. In one embodiment of the invention, the glass has a tin side and an opposite air side, wherein the tin side of the glass is supported on a molten tin bath during forming of the glass. The tin concentration at the tin side of the glass is greater than, less than, or equal to the tin concentration in "body portion" of the glass. The "body portion" of the glass extending from the air side of the glass toward the tin side and terminating short of the tin side of the glass.

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1000883P1	LOW IRON, HIGH REDOX RATIO, AND HIGH IRON, HIGH REDOX RATIO, SODA-LIME-SILICA GLASSES AND METHODS OF MAKING SAME	US	15/071905	16-Mar-2016	US-2016-0194238-A1			A glass has a basic soda-lime-silica glass portion, and a colorant portion including total iron as Fe2O3 selected from the group of total iron as Fe2O3 in the range of greater than zero to 0.02 weight percent, total iron as Fe2O3 in the range greater than 0.02 weight percent to less than 0.10 weight percent and total iron as Fe2O3 in the range of 0.10 to 2.00 percent, redox ratio in the range of 0.2 to 0.9, and tin and/or tin compounds, e.g. SnO2 greater than 0.000 to 5.0 weight percent. In one embodiment of the invention, the glass has a tin side and an opposite air side, wherein the tin side of the glass is supported on a molten tin bath during forming of the glass. The tin concentration at the tin side of the glass is greater than, less than, or equal to the tin concentration in "body portion" of the glass. The "body portion" of the glass extending from the air side of the glass toward the tin side and terminating short of the tin side of the glass.
1208A1	REDUCTION OF SOLID DEFECTS IN GLASS DUE TO REFRACTORY CORROSION IN A FLOAT GLASS OPERATION	US	08/758138	25-Nov-1996		5795363	18-Aug-1998	The present invention provides an apparatus and method for reducing the occurrences of solid defects in float glass due to corrosion of refractory in a glass melting and refining furnace. In making flat glass by the float process, batch materials are fed into a melting and refining furnace and heated to form molten glass. The molten glass passes through the melting section and into a refining section of the furnace where the glass is gradually cooled and conditioned prior to delivering the glass to a forming chamber where the molten glass is floated upon molten metal and formed into a continuous sheet of glass. During the melting operation, alkali vapors from the molten glass accumulate within a downstream portion of the melting section. These vapors attack and corrode those portions of the melting section of the furnace which are constructed from silica refractory. The products of the corrosion are deposited in the molten glass resulting in solid defects. In the present invention, a nonreactive gas is directed into the downstream portion of the melting section at a temperature ... greater than that of the molten glass within the melting section and at a gas volume sufficient to reduce the amount of alkali vapors in the downstream portion of the melting section. As a result, the corrosion of the silica refractory is reduced and the total occurrences of solid defects in the glass due to refractory corrosion is reduced. In an embodiment of the invention, the gas is the combustion products from burners that are positioned in the downstream portion of the melting section of the furnace.
1240A1	PHOTOCATALYTICALLY-ACTIVATED SELF-CLEANING ARTICLE AND METHOD OF MAKE SAME	US	08/838257	01-Apr-1997		6027766	22-Feb-2000	A method and article are disclosed wherein a substrate is provided with a photocatalytically-activated self-cleaning surface by forming a photocatalytically-activated self-cleaning coating on the substrate by spray pyrolysis chemical vapor deposition or magnetron sputter vacuum deposition. The coating has a thickness of at least about 500 Angstroms to limit sodium-ion poisoning to a portion of the coating facing the substrate. Alternatively, a sodium ion diffusion barrier layer is deposited over the substrate prior to the deposition of the photocatalytically-activated self-cleaning coating to prevent sodium ion poisoning of the photocatalytically-activated self-cleaning coating. The substrate includes glass substrates, including glass sheet and continuous float glass ribbon.
1240B1	PHOTOCATALYTICALLY-ACTIVATED SELF-CLEANING ARTICLE AND METHOD OF MAKING SAME	US	09/282940	01-Apr-1999		6413581B1	02-Jul-2002	A method and article are disclosed wherein a substrate is provided with a photocatalytically-activated self-cleaning surface by forming a photocatalytically-activated self-cleaning coating on the substrate by spray pyrolysis chemical vapor deposition or magnetron sputter vacuum deposition. The coating has a thickness of at least about 500 Angstroms to limit sodium-ion poisoning to a portion of the coating facing the substrate. Alternatively, a sodium ion diffusion barrier layer is deposited over the substrate prior to the deposition of the photocatalytically-activated self-cleaning coating to prevent sodium ion poisoning of the photocatalytically-activated self-cleaning coating. The substrate includes glass substrates, including glass sheet and continuous float glass ribbon.
1240D2	PHOTOCATALYTICALLY-ACTIVATED SELF-CLEANING ARTICLE AND METHOD OF MAKING SAME	US	10/075316	14-Feb-2002	01-14945-A1	6722156B2	20-Apr-2004	A method and article are disclosed wherein a substrate is provided with a photocatalytically-activated self-cleaning surface by forming a photocatalytically-activated self-cleaning coating on the substrate by spray pyrolysis chemical vapor deposition or magnetron sputter vacuum deposition. The coating has a thickness of at least about 500 Angstroms to limit sodium-ion poisoning to a portion of the coating facing the substrate. Alternatively, a sodium ion diffusion barrier layer is deposited over the substrate prior to the deposition of the photocatalytically-activated self-cleaning coating to prevent sodium ion poisoning of the photocatalytically-activated self-cleaning coating. The substrate includes glass substrates, including glass sheet and continuous float glass ribbon.

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12474A1	REDUCTION OF NOx EMISSIONS IN A GLASS MELTING FURNACE	US	08/851308	05-May-1997		5893940	13-Apr-1999	A method of controlling NOx emissions from a glass melting process in which combustion fuel produces exhaust gas in melting furnace including NOx compounds is disclosed. Furnace exhaust gas passes from the melting furnace through regenerator to a zone downstream from the regenerator. Ammonia is injected into the furnace exhaust gas at the downstream zone while the furnace exhaust gas is within a desired temperature range to reduce the amount of NOx compounds. Additional gas is introduced into the furnace exhaust gas as it moves from the regenerator to the downstream zone whenever the furnace exhaust gas has a temperature which is outside the desired temperature range at the downstream zone so as to modify the furnace exhaust gas temperature such that the furnace exhaust gas is within the desired temperature range when furnace exhaust gas reaches to the downstream zone. In one particular embodiment of the invention, the additional gas is the exhaust from an excess air burner which is injected into the furnace exhaust gas at a temperature such that the furnace exhaust gas and the injected gas have a combined temperature between about 870 to 1090 DEG. C. at the downstream zone.
12654A1	METHOD AND APPARATUS FOR REDUCING TIN DEFECTS IN FLOAT GLASS	US	08/874629	06-Jun-1997		6094942	01-Aug-2000	The present invention provides a method of reducing tin defects in flat glass made by the float process. In the float process molten glass is delivered onto a pool of molten tin within an enclosed chamber and formed into a glass ribbon. Oxygen dissolved in the molten tin combines with the tin to form tin oxide which vaporizes and collects within the chamber, creating defects in the glass. In the present invention, hydrogen gas is introduced directly into the molten tin to react with the oxygen gas and tin oxide within the molten tin to form water and elemental tin, resulting in a reduction in the amount of oxide within the molten tin. In one particular embodiment of the invention, the hydrogen gas is introduced into the tank through an elongated, porous graphite member submerged in the molten tin within the forming chamber such that it extends along and is located outboard of selected portions of the edge of the glass ribbon.
12661A1	SILICON OXYNITRIDE PROTECTIVE COATINGS	US	09/409440	14-Nov-2000		6495251B1	17-Dec-2002	A layer for protecting an underlying functional coating stack for example a single silver layer or double silver layer Low-E coating stack, includes silicon oxynitride or silicon aluminum oxynitride layer. The protective film may have a uniform composition throughout its thickness i.e. homogeneous protective layer, a constantly increasing or decreasing index of refraction throughout its thickness i.e. a graded protective layer, or a combination of all or some of the foregoing i.e. a non-homogeneous protective layer. The graded and non-homogeneous layers may have an outer surface of silicon nitride, silicon aluminum nitride, silicon dioxide, silicon oxynitride or silicon aluminum oxynitride. The protective layer of the invention may be the last layer deposited on the functional coating stack or may have a film deposited thereon.
12678A1	PHOTOELECTROLYTICALLY-DESICCATING MULTIPLE-GLAZED WINDOW UNITS	US	08/927190	02-Sep-1997		5873203	23-Feb-1999	A multiple-glazed window unit of the type which includes two or more sheets maintained in spaced relationship to each other by a spacing assembly to form an airspace wherein surfaces of the unit in contact with the airspace are subject to the accumulation thereon of moisture and/or organic contaminants present in the airspace is rendered self-desiccating of accumulated moisture and/or self-cleaning of accumulated organic surface contaminants by coating such surfaces with a photoelectrolytically desiccating coating and/or a photocatalytically-activated self-cleaning coating. Upon exposing the coatings to actinic radiation, at least a portion of the accumulated moisture is removed by photoelectrolysis and/or at least a portion of the organic contaminants are removed by photocatalytic decomposition. A desiccant may or may not be associated with the airspace to assist in maintaining a moisture-free airspace. Exterior surfaces of the unit may also be rendered self-cleaning of accumulated organic surface contaminants by coating such exterior surfaces with a photocatalytically-activated self-cleaning coating.
12972P1	INFRARED AND ULTRAVIOLET RADIATION ABSORBING BLUE GLASS COMPOSITION	US	09/355881	09-Apr-1999		6313065B1	06-Nov-2001	The present invention provides a blue colored glass using a standard soda-lime-silica glass base composition and additionally iron and cobalt, and optionally chromium, as solar radiation absorbing materials and colorants. In particular, the blue colored glass includes about 0.40 to 1.0 wt. % total iron, preferably about 0.50 to 0.75 wt. %, about 4 to 40 PPM CoO, preferably about 4 to 20 PPM, and 0 to 100 PPM Cr_2O_3. The redox ratio for the glass of the present invention is greater than 0.35 up to about 0.60, and preferably between about 0.35 to 0.50. In one particular embodiment of the invention, the glass has a luminous transmittance of at least 50% and a color characterized by a dominant wavelength of 485 to 489 nanometers and an excitation purity of about 3 to 18 percent. In another embodiment of the invention, the glass has a luminous transmittance of at least 65% at a thickness of about 0.154 inches (3.9 mm) and a color characterized by a dominant wavelength of 485 to 492 nanometers and an excitation purity of about 3 to 18 percent.

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129772	INFRARED AND ULTRAVIOLET RADIATION ABSORBING GLASS ARTICLE AND METHOD	US	09/468792	10-Dec-1999		6673730B1	06-Jan-2004	The present invention provides a high redox, ultraviolet and/or infrared absorbing radiation absorbing, and colored glass using a standard soda-lime-silica glass base composition and additionally at least an essential solar absorbing and color set of components. The solar absorbing flat glass article has two opposing major surfaces with a thickness of 1.5 to 12 and a redox value in the range of greater than 0.38 to about 0.6, a retained sulfate measured as (SO3) value in the range greater than 0.005 to less than 0.12 weight percent, and is essentially free of colorants from inorganic polysulfides.
130741	PRIVACY GLASS	US	09/360186	08-Dec-1999		6103650	15-Aug-2000	The present invention provides a green colored, infrared and ultraviolet absorbing glass composition having a luminous transmittance of up to 60 percent. The glass composition uses a standard soda-lime-silica glass base composition and additionally iron, cobalt, chromium, and titanium as infrared and ultraviolet radiation absorbing materials and colorants. glass of the present invention has a color characterized by a dominant wavelength in the range of about 480 to 510 nanometers, preferably about 490 to 505 nanometers, with an excitation purity of no higher than about 20%, preferably about 5 to 15%. In one embodiment of the invention, the glass composition of a green colored, infrared and ultraviolet radiation absorbing soda-lime-silica glass article includes a solar radiation absorbing and colorant portion consisting essentially of about 0.90 to 2.0 percent by weight total iron, about 0.17 to 0.52 percent by weight FeO, about 40 to 150 P CoO, about 250 to 800 PPM Cr2O3, and about 0.1 to 1 percent by weight TiO2.
132552	COMPOSITIONS AND METHODS FOR FORMING COATINGS OF SELECTED COLOR ON A SUBSTRATE AND ARTICLES PRODUCED THEREBY	US	10/693483	24-Oct-2003	US-2004-0116161-A1	7897479	04-Mar-2008	A coated article comprising a substrate and a copper oxide and manganese oxide coating over the substrate, the coating having the molar ratio of copper to manganese in the range of about 0.8 to 1.2 and a blue color in transmission is disclosed....
134503	MULTI-SHEET GLAZING UNIT HAVING A SINGLE SPACER FRAME AND METHOD OF MAKING SAME	US	09/842494	26-Apr-2001	0015097	6415566B2	09-Jul-2002	A multi-sheet glazing unit includes a closed spacer frame, the spacer frame has one side having a pair of legs joined to a base to provide the spacer frame with a U-shaped cross-section. An inner sheet has an edge mounted in an edge receiving member mounted between the legs of the U-shaped side of the spacer frame. The remaining edges of the inner sheet are within the interior of the closed spacer frame and spaced from the spacer frame. The inner sheet is held within the spacer frame by sheet retaining members mounted to the spacer frame. A sheet e.g. glass sheet is secured by a moisture-impervious adhesive to outer surface of each of the legs of the spacer frame. One type of sheet retaining members has a horizontal member and a vertical member, and a locking member. The locking member is mounted on the horizontal member spaced from the vertical member to form a groove to hold the inner sheet within the closed interior of the spacer frame. Another type of the sheet retaining member includes a pair of flexible fingers mounted on a platform member, angled away from the platform member toward one another and having their ends spaced from one another to provide a groove to hold the inner sheet within the closed interior of the spacer frame. A method for making the unit is also disclosed.
134503	MULTI-SHEET GLAZING UNIT AND METHOD OF MAKING SAME	US	09/990737	21-Nov-2001	0032984-A1	6477812B2	12-Nov-2002	A multi-sheet glazing unit includes a closed spacer frame, the spacer frame has one side having a pair of legs joined to a base to provide the spacer frame with a U-shaped cross-section. An inner sheet has an edge mounted in an edge receiving member mounted between the legs of the U-shaped side of the spacer frame. The remaining edges of the inner sheet are within the interior of the closed spacer frame and spaced from the spacer frame. The inner sheet is held within the spacer frame by sheet retaining members mounted to the spacer frame. A sheet e.g. glass sheet is secured by a moisture-impervious adhesive to outer surface of each of the legs of the spacer frame. One type of sheet retaining members has a horizontal member and a vertical member, and a locking member. The locking member is mounted on the horizontal member spaced from the vertical member to form a groove to hold the inner sheet within the closed interior of the spacer frame. Another type of the sheet retaining member includes a pair of flexible fingers mounted on a platform member, angled away from the platform member toward one another and having their ends spaced from one another to provide a groove to hold the inner sheet within the closed interior of the spacer frame. A method for making the unit is also disclosed.

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1345D4	MULTI-SHEET GLAZING UNIT AND METHOD OF MAKING SAME	US	10/277680	22-Oct-2002	0033761A1	671524482	06-Apr-2004	A multi-sheet glazing unit includes a closed spacer frame, the spacer frame has one side having a pair of legs joined base to provide the spacer frame with a U-shaped cross-section. An inner sheet has an edge mounted in an edge re member mounted between the legs of the U-shaped side of the spacer frame. The remaining edges of the inner she within the interior of the closed spacer frame and spaced from the spacer frame. The inner sheet is held within the sp frame by sheet retaining members mounted to the spacer frame. A sheet e.g. glass sheet is secured by a moisture- impervious adhesive to outer surface of each of the legs of the spacer frame. One type of sheet retaining members h horizontal member and a vertical member, and a locking member. The locking member is mounted on the horizontal member spaced from the vertical member to form a groove to hold the inner sheet within the closed interior of the spa frame. Another type of the sheet retaining member includes a pair of flexible fingers mounted on a platform member, angled away from the platform member toward one another and having their ends spaced from one another to provide groove to hold the inner sheet within the closed interior of the spacer frame. A method for making the unit is also dis
1345P1	MULTI-SHEET GLAZING UNIT AND METHOD OF MAKING SAME	US	09/078788	14-May-1998		6115989	12-Sep-2000	A multi-sheet glazing unit includes a closed spacer frame, the spacer frame has one side having a pair of legs joined base to provide the spacer frame with a U-shaped cross-section. An inner sheet has an edge mounted in an edge re member mounted between the legs of the U-shaped side of the spacer frame. The remaining edges of the inner she within the interior of the closed spacer frame and spaced from the spacer frame. The inner sheet is held within the sp frame by sheet retaining members mounted to the spacer frame. A sheet e.g. glass sheet is secured by a moisture- impervious adhesive to outer surface of each of the legs of the spacer frame. One type of sheet retaining members h horizontal member and a vertical member, and a locking member. The locking member is mounted on the horizontal member spaced from the vertical member to form a groove to hold the inner sheet within the closed interior of the spacer frame. Another type of the sheet retaining member includes a pair of flexible fingers mounted on a platform member, angled away from the platform member toward one another and having their ends spaced from one another to provide a groove to hold the inner sheet within the closed interior of the spacer frame. A method for making the unit is also disclosed.
1360P1	BRONZE PRIVACY GLASS	US	09/510957	22-Feb-2000		6455451281	24-Sep-2002	The present invention provides a bronze colored, infrared and ultraviolet absorbing glass composition having a luminous transmittance of up to 60 percent. The glass uses a standard soda-lime-silica glass base composition and additionally iron and selenium, and optionally cobalt, as infrared and ultraviolet radiation absorbing materials and colorants. The glass of the present invention has a luminous transmittance (LTA) of up to 60 percent and its color is characterized by a dominant wavelength in the range of 560 to 590 nanometers and an excitation purity of 12 to 75% at a thickness of 0.160 inches (4.06 mm). In one embodiment of the invention, the glass composition of a bronze colored, infrared and ultraviolet radiation absorbing soda-lime-silica glass article includes a colorant portion having 0.7 to 2.2 percent by weight total iron, 0.15 to 0.5 percent by weight FeO, 3 to 100 PPM Se, and optionally up to 200 PPM CuO, and preferably 1.1 to 1.4 percent by weight total iron, 0.24 to 0.36 percent by weight FeO, 20 to 45 PPM Se, and 0 to 70 PPM CuO.
1366D1	MULTILAYERED ANTIREFLECTIVE COATING WITH A GRADED BASE LAYER	US	09/054666	03-Apr-1998		5948131	07-Sep-1999	An antireflectance coating is disclosed comprising a first graded layer wherein the composition is varied throughout the thickness of the layer such that the refractive index of the graded layer varies from a low refractive index approximately matching the refractive index of the substrate at the interface of the graded layer and the substrate to a higher refractive index at the surface of the graded layer opposite the interface with the substrate, and a second substantially homogeneous layer of a composition selected to have a refractive index which is approximately the square root of the product of the higher refractive index of the graded layer and the refractive index of the incident medium at the surface of the second layer opposite the interface of the second layer with the graded layer, having an optical thickness of approximately at least one quarter of a selected design wavelength. The antireflectance properties of the coating of the present invention can be expanded to a broader range of reflected wavelengths by incorporating, between the graded layer and the second substantially homogeneous layer, an intermediate layer having a relatively high refractive index and an optical thickness of about half the design wavelength.
1367A1	CONDUCTIVE ANTIREFLECTIVE COATINGS AND METHODS OF PRODUCING SAME	US	09/287305	07-Apr-1999		6436541B1	20-Aug-2002	This invention relates to a two layer or more anti-static film coating deposited on a substrate. Selected layers of the film may have anti-static and/or electromagnetic properties. In one embodiment, the film farthest from the substrate has an index of refraction lower than the underlying film. In another embodiment, the surface of the film is roughened to provide a graded index of refraction.

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13756A1	SHIPPABLE HEAT-TREATABLE SPUTTER COATED ARTICLE AND ZINC CATHODE SPUTTERING TARGET CONTAINING LOW AMOUNTS OF TIN	US	09/102469	30-Apr-1998		6899953B1	31-May-2005	Tin is added to a zinc cathode target to enhance the sputter efficiency of the target. Films deposited using the cathode greater than zero but less than 10 weight percent tin and greater than 90 but less than 100 weight percent zinc improv chemical durability of a high transmittance, low emissivity coating stack over coating stacks having zinc oxides witho oxide. High transmittance, low emissivity coating stacks are heated with the heated coating having reduced haze by selecting the thickness of metal primer layer between an infrared reflective film, e.g., a silver film and a dielectric film, 52-48 zinc stannate, zinc oxide, tin oxide film or a zinc oxide film. Also disclosed are enhancing films that lower the re of silver films deposited thereon and improve chemical durability of the coating stack.
13758D1	SHIPPABLE HEAT-TREATABLE SPUTTER COATED ARTICLE AND METHOD OF MAKING SAME	US	11/017139	20-Dec-2004	5/155695A1	7323433	12-Feb-2008	The present invention provides a method of making a coated article, including the steps of: (A) providing a substrate; depositing one or more dielectric layers over the substrate, the dielectric layers comprising: (i) a first dielectric film hav least one film of zinc oxide, silicon oxide, tin oxide, silicon nitride, silicon oxynitride, or an oxide of an alloy of zinc and having zinc in a weight percent range of 10 to 90 and tin in a weight percent range of 90 to 10, and (ii) a second dielec film deposited over the first dielectric film, the second dielectric film having at least a zinc oxide, tin oxide film, where zinc oxide, tin oxide film has tin in a weight percent range of greater than 0 to less than 10 and the majority of the bala being zinc; and (C) depositing one or more infrared reflective layers on at least one of the dielectric layers.
13759D	PROTECTIVE LAYERS FOR SPUTTER COATED ARTICLE AND METHOD FOR MAKING SPUTTER COATED ARTICLES	US	11/017330	20-Dec-2004	5/129663A1	7419768	19-Aug-2008	The present invention provides is a method of making an infrared reflective coated article, including the steps of: prov substrate, depositing a first dielectric layer over at least a portion of the substrate, the layer comprising a first zinc sta film deposited over the substrate, and an electron enhancing film deposited over the first zinc stannate film, the electron enhancing film selected from zinc oxide-tin oxide film and a second zinc stannate film; forming an infrared reflective layer on the first dielectric layer; forming a metal primer layer over the infrared reflective layer; forming a second dielectric layer over the primer layer, and forming a protective layer of at least two films in a position where it can provide durability to the dielectric layer, infrared reflective layer, metal primer layer, and second dielectric layer.
13759P1	PROTECTIVE LAYERS FOR SPUTTER COATED ARTICLE	US	09/354193	16-Jun-1999		6830194B1	21-Dec-2004	Tin is added to a zinc cathode target to enhance the sputter efficiency of the target. Films deposited using the cathode, e.g. greater than zero but less than 10 weight percent tin and greater than 90 but less than 100 weight percent zinc improve the chemical durability of a high transmittance, low emissivity coating stack over coating stacks having zinc oxides without tin oxide. High transmittance, low emissivity coating stacks are heated with the heated coating having reduced haze by selecting the thickness of metal primer layer between an infrared reflective film, e.g. a silver film and a dielectric film, e.g., a 52-48 zinc stannate, zinc oxide, tin oxide film or a zinc oxide film. Also disclosed are enhancing films that lower the resistivity of silver films deposited thereon and improve chemical durability of the coating stack.
13766A1	BLUE PRIVACY GLASS	US	09/076566	12-May-1998		6656866B1	02-Dec-2003	The present invention provides a blue colored, infrared and ultraviolet absorbing glass composition having a luminous transmittance of up to 80 percent. The glass uses a standard soda-lime-silica glass base composition and additionally iron and cobalt, and optionally selenium and/or titanium, as infrared and ultraviolet radiation absorbing materials and colorants. The glass of the present invention has a color characterized by a dominant wavelength in the range of 480 to 488 nanometers and an excitation purity of at least 8 percent at a thickness of 0.160 inches (4.06 millimeters). In one embodiment of the invention, the glass composition of a blue colored, infrared and ultraviolet radiation absorbing soda-lime-silica glass article includes a solar radiation absorbing and colorant portion consisting essentially of 0.9 to 2.0 percent by weight total iron, 0.15 to 0.65 percent by weight FeO, 90 to 250 PPM CoO, and optionally up to 12 PPM Se and up to 0.9 wt % TiO sub.2, and preferably 1 to 1.4 percent by weight total iron, 0.20 to 0.60 percent by weight FeO, 100 to 150 PPM CoO, up to 8 PPM Se, and up to 0.5 wt % TiO sub.2
13768P1	LIMITED VISIBLE TRANSMISSION BLUE GLASSES	US	10/047353	14-Jan-2002	01980094A1	6897570B2	11-Oct-2005	The present invention provides a blue colored, infrared and ultraviolet absorbing glass composition having a luminous transmittance of up to 80 percent. This glass composition can form transparent glass panels that have varying limited LTA from one another as panel sets for mounting in automobiles. The glass uses a standard soda-lime-silica glass base composition and additionally iron and cobalt, and optionally selenium and/or titanium, as infrared and ultraviolet radiation absorbing materials and colorants. The glass of the present invention has a color characterized by a dominant wavelength in the range of 480 to 489 nanometers and an excitation purity of at least 8 percent at a thickness of 0.160 inches (4.06 millimeters). In one embodiment of such a blue colored, infrared and ultraviolet radiation absorbing soda-lime-silica glass article includes a solar radiation absorbing and colorant portion having 0.9 to 2.0 percent by weight total iron, 0.15 to 0.65 percent by weight FeO, 90 to 250 PPM CoO, and optionally up to 12 PPM Se and up to 0.9 wt% TiO2, and preferably 1 to 1.4 percent by weight total iron, 0.20 to 0.60 percent by weight FeO, 100 to 150 PPM CoO, up to 8 PPM Se, and up to 0.5 wt% TiO2

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14009607A1	AUTOMATED FLOAT GLASS SYSTEM	US	14/925158	28-Oct-2015	US-2015-0122024-A1			A float glass system (10) includes a float bath (14) having an entrance end (22) and an exit end (26). At least one m vision camera (50, 52, 76, 92) is located to view an interior of the float bath (14). At least one sensor (44, 46, 90, 96 connected to the float ba h (14) to measure an operating parameter of the float bath (14). At least one operating de 60, 62, 98) is connected to the float bath (14). The at least one machine vision camera (50, 52, 76, 92), the at least sensor (44, 46, 90, 96), and the at least one operating device (62, 60, 62, 98) are connected to a control system (40 configured to control the operating device (62, 60, 62, 98) based on input from the at least one machine vision came 52, 76, 92) across the at least one sensor (44, 46, 70, 96).
14009663A1	"Quad-Silver" (4xAg) and "Sub Quad-Ag" Coating Designs	US	15/013600	02-Feb-2016	US-2016-0229739-A1			A solar control coating includes at least four phase adjustment layers and at least four metal functional layers. At le of the metal functional layers can be a continuous layer. At least one of the metal functional layers can be a subcrit layer. The solar control coating provides reference IGU values of luminous transmittance no greater than 64%, SHX greater than 0.5, and LSG of at least 1.85.
1401A1	INSULATING UNITLESS WINDOW SASH	US	09/121870	12-Apr-2000		6886279B1	03-May-2005	An insulating unitless window sash includes a sash frame made of four linear sash members having their mitered e joined together. Each of the sash members in cross section includes a peripheral surface, a first and outer side with first groove spaced from a second groove. Each of the grooves has a base and spaced walls. The base of the first g spaced a greater distance from the peripheral surface than the base of the second groove. Peripheral and marginal of a first sheet are in the first groove and peripheral and marginal edges of a second sheet are in the second groove s mounted on the sash frame adjacent the outer surface of the first sheet to give a balance configuration. A method of fabricating the insulating unitless sash is also disclosed.
1423A1	REUSABLE MASK AND METHOD FOR COATING SUBSTRATE	US	09/391989	08-Sep-1999		6284021B1	28-Aug-2001	A mask article and method of coating are provided whereby coating is deleted from one or more portions of a substrate the masks edges during a coating operation. The mask is a semi-rigid device having two major generally opposing surfaces and one or more sides between such surfaces with at least one one-piece edge. The side(s) slope inward toward the interior of the solid part of the mask at an angle from the horizontal plane of the larger major surface of the mask up to the slope of the side from greater than 0o to less than 90o. This inward slope is somewhere along the side between the larger major surface and the smaller major surface. The sloping segment of the side should extend a distance sufficient to provide an adequate edge at the mask-coating-substrate interface to reduce the ghosting effect. The surface area of the larger area surface has the configuration of the shape of a deletion for the coating. The mask is adapted for secure placement on the substrate during the coating process and removal therefrom after the coating process. This is accomplished either by the weight of the mask itself or from the use of at least one friction enhancing member present on the mask. With the presence of friction enhancing member(s) on the mask, recesses are also optionally provided on the mask. The number, size, configuration and location of the recesses and friction enhancing members assist in the stackability of a plurality of the masks. After one or more coatings are applied to the masked substrate, the masks can be removed and conveyed to the beginning of coating operation to mask other substrates. After a number of such cycles the masks can be cleaned of coating and reused.
1434A2	METHODS OF MAKING LOW HAZE COATINGS AND THE COATINGS AND COATED ARTICLES MADE THEREBY	US	09/521845	09-Mar-2000		6797388B1	28-Sep-2004	A coating in accordance with the invention has a substantially crystalline first layer with a substantially crystalline second layer provided over the first layer. A breaker layer is provided between the first and second layers and is configured to prevent or at least reduce epitaxial growth of the second layer on the first layer. A color suppression layer may be provided below the first layer. The coating can be provided on a substrate to make a coated article. A method of coating a substrate includes depositing a substantially crystalline first layer over at least a portion of the substrate and depositing a breaker layer over the first layer. The breaker layer is configured to prevent or at least reduce epitaxial growth of a subsequently deposited layer on the first layer. Furthermore a coated article is disclosed comprising a graded color suppression layer and a conductive metal oxide layer. Further embodiments are claimed wherein a coated article comprises two differently doped oxide layers.
1435A1	BENDING MOLD HAVING SIDE MOUNTED WEIGHT ASSEMBLIES AND METHOD OF USE THEREOF	US	09/191009	12-Nov-1998		6003343	28-Dec-1999	The invention provides an articulated bending mold for shaping heat softened substrates, e.g., glass sheets, into curved shapes. The bending mold has a central portion with at least one, and preferably two, pivoting end sections. A biasing assembly is mounted on the side of the mold between the end section pivot points, preferably on board of the end section pivot points and in proximity to an outer side of the end section. The biasing assembly includes a weight arm with a linkage assembly mounted on one end of the weight arm and connected to the end section, preferably at or near an outer corner of the end section.

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1454A1	METHODS AND APPARATUS FOR PRODUCING SILVER BASED LOW EMISSIVITY COATINGS WITHOUT THE USE OF METAL PRIMER LAYERS AND ARTICLES PRODUCED THEREBY	US	09/215560	18-Oct-2000		6399928B1	04-Jun-2002	Methods are presented for depositing an infrared reflective, e.g., silver, containing multi-layer coating onto a substrate to form a coated article. One or more ceramic cathodes are used to deposit a protective layer over the silver layer. The use of the ceramic cathodes eliminates the need for the metal primer layers common in the prior art. Both the infrared reflective layer and a ceramic layer can be deposited in the same coating zone, this coating zone containing sufficient oxygen to provide a substantially oxidize a ceramic coating layer without adversely impacting upon the properties of the infrared reflective layer.
1501087A1	LOW EMISSIVITY COATING FOR WINDOWS IN COLD CLIMATES	US	15/248437	18-Aug-2016				A low emissivity coating 30 includes a plurality of phase adjustment layers 48, 58, 62, a first metal functional layer 46, a second metal functional layer 56 located over and spaced from the first metal functional layer 46. A ratio of the geometric thickness of the first metal functional layer divided by the geometric thickness of the second metal functional layer is a range of 0.8 to 1. The low emissivity coating 30 provides a reference IGU summertday SHGC of at least 0.4 and a reference IGU winternight U factor of no greater than 0.4 BTU/hr·ft2·°F (2.27 W/m2·K).
1501087V1	High SHGC low-e films	US	62/282039	24-Feb-2016				A low emissivity coating includes a first phase adjustment layer, a first metal functional layer located over the first phase adjustment layer, a first primer layer located over the first metal functional layer, a second phase adjustment layer is over the first primer layer, a second metal functional layer located over the second phase adjustment layer, a second primer layer located over the second metal functional layer, a third phase adjustment layer located over the second primer layer, and a protective layer located over the third phase adjustment layer. The low emissivity coating provides a reference IGU SHGC of at least 0.4 and a reference IGU U factor of no greater than 0.4.
1513A1	LIGHT-TRANSMITTING AND/OR COATED ARTICLE WITH REMOVABLE PROTECTIVE COATING AND METHODS OF MAKING THE SAME	US	09/567934	10-May-2000		6842283B1	01-Feb-2005	A method and coating are provided for temporarily protecting a substrate or article during shipping, handling or storage by applying a removable protective coating over at least a portion of the substrate. The substrate may be flat or curved and may have zero, one or more functional coatings. A plurality of substrates with the protective coating of the invention may be arranged in a shipping container so that the protective coating reduces the possibility of damage to the substrate or optional functional coating. In one embodiment, the protective coating is the evaporation or reaction product of an aqueous coating composition containing a polyvinyl alcohol polymer which may be subsequently removed by aqueous washing, thermal decomposition or combustion. In another embodiment, the protective coating is formed by sputtering a substantially carbon coating onto the substrate. The carbon coating is subsequently removed by combustion. The protective coating may have identification materials, such as colorants or fragrance materials, such that different types of substrates and/or functional coatings can be distinguished from each other. Additionally, the temporary protective coating can improve the heating of a functionally coated glass substrate.
1518D1	LIGHT TRANSMITTING AND/OR COATED ARTICLE WITH REMOVABLE PROTECTIVE COATING AND METHODS OF MAKING THE SAME	US	10/080629	22-Feb-2002	0175998A1	6682773B2	27-Jan-2004	A method and coating are provided for temporarily protecting a substrate or article during shipping, handling or storage by applying a removable protective coating over at least a portion of the substrate. The substrate may be flat or curved and may have zero, one or more functional coatings. A plurality of substrates with the protective coating of the invention may be arranged in a shipping container so that the protective coating reduces the possibility of damage to the substrate or optional functional coating. In one embodiment, the protective coating is the evaporation or reaction product of an aqueous coating composition containing a polyvinyl alcohol polymer which may be subsequently removed by aqueous washing, thermal decomposition or combustion. In another embodiment, the protective coating is formed by sputtering a substantially carbon coating onto the substrate. The carbon coating is subsequently removed by combustion. The protective coating may have identification materials, such as colorants or fragrance materials, such that different types of substrates and/or functional coatings can be distinguished from each other. Additionally, the temporary protective coating can improve the heating of a functionally coated glass substrate.
1513P1	COATED ARTICLE WITH REMOVABLE PROTECTIVE COATING AND RELATED METHODS	US	11/017156	09-Dec-2004	5153126A1	7361404	22-Apr-2008	A coated article is disclosed. The coated article of the invention includes a substrate having a surface and a removable protective coating comprising up to 100 weight percent of a carbon-containing material deposited over at least a portion of the substrate, where the weight percentages are based on the total weight of the removable protective coating.
1501I0I09A1	SOLAR CONTROL COATING WITH ENHANCED SOLAR CONTROL PERFORMANCE	US	15/251025	30-Aug-2016				A solar control coating (30) includes a first phase adjustment layer (40); a first metal functional layer (46); a second phase adjustment layer (50); a second metal functional layer (56); a third phase adjustment layer (62); a third metal functional layer (70); a fourth phase adjustment layer (80); and optionally, a protective layer (82). At least one of the metal functional layers (46, 56, 70) includes a metal functional multi-ion layer including (i) at least one infrared reflective film and (ii) at least one absorptive film.

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1601100PV1	Coating Designs for Improved Solar Control Performance Products (specifically Sedona 80 Glass)	US	62/311440	22-Mar-2016				A solar control coating (90) includes a first phase adjustment layer (40), a first metal functional layer (46), a second pha adjustment layer (50), a second metal functional layer (58), a third phase adjustment layer (62), a third metal functional (70), a four h phase adjustment layer (66), and optionally, a protective layer (92). At least one of the metal functional la (46, 58, 70) includes a metal functional multi-film layer including (i) at least one infrared reflective film (57, 73) and (ii) a least one absorptive film (59, 71).
1618A1	METHODS OF OBTAINING PHOTOACTIVE COATINGS AND/OR ANATASE CRYSTALLINE PHASE OF TITANIUM OXIDES AND ARTICLES MADE THEREBY	US	09/943163	30-Aug-2001	00450734	6677063B2	13-Jan-2004	Hydrophilic and/or rutile and anatase titanium oxide are obtained by sputter depositing titanium metal oxide on a film o zirconium oxide in the cubic phase. Another technique is to deposit a titanium metal on a film of zinc oxide in the cubic phase and heating the coating in an oxidizing atmosphere to provide an anatase and/or rutile phase(s) of titanium oxide
1618C1	METHODS OF OBTAINING PHOTOACTIVE COATINGS AND/OR ANATASE CRYSTALLINE PHASE OF TITANIUM OXIDES AND ARTICLES MADE THEREBY	US	11/830089	30-Jul-2007	US08-0248291-A1			A method of forming a material having a predetermined crystalline phase includes forming a film, forming a material, a heating one of a substrate, the film, or the material to have the material have at least one predetermined crystalline pha The formed film includes a baddeleyite crystalline phase of zirconium oxide over at least a portion of a substrate surfac and enhance the growth of the predetermined crystal phase defined as a first forming step. The formed material is selec from at least one metal oxide or semiconductor metal oxide on the film defined as a second forming step.
1618P1	METHODS OF OBTAINING PHOTOACTIVE COATINGS AND/OR ANATASE CRYSTALLINE PHASE OF TITANIUM OXIDES AND ARTICLES MADE THEREBY	US	10/403517	08-Apr-2003	0236721	7321249	22-Jan-2008	A method of making a photoactive coating includes depositing a first coating material containing zirconium oxide over at least a portion of a substrate and depositing a second coating material containing titanium oxide over at least a portion of the first coating material to provide a coated substrate. At least one of the first and second coating materials is deposited by pyrolytic deposition.
1618P1/D1	METHODS OF OBTAINING PHOTOACTIVE COATINGS AND/OR ANATASE CRYSTALLINE PHASE OF TITANIUM OXIDES AND ARTICLES MADE THEREBY	US	11/871395	09-Jun-2009	US08-0134490-A1	7842338	30-Nov-2010	A method of making a photoactive coating includes depositing a first coating material containing zirconium oxide over at least a portion of a substrate and depositing a second coating material containing titanium oxide over at least a portion of the first coating material to provide a coated substrate. At least one of the first and second coating materials is deposited by pyrolytic deposition.
1632A1	REUSABLE RESTRAINT FOR SECURING ARTICLES FOR SHIPPING AND/OR STORAGE	US	09/955777	19-Sep-2001	009-1429A1	6896941B2	31-May-2005	A restraint for packaging glass sheets includes a first leg and a second leg, each leg having an inner surface configured to contact at least a portion of the glass sheets and an outer surface. The first and second legs define a vertex. The inner surfaces are made at least partly of a compressible material and the outer surfaces are made at least partly of a material having a hardness greater than that of the compressible material.
1632P1	CORNER RESTRAINT FOR SECURING ARTICLES ON A SHIPPING AND/OR STORAGE RACK	US	11/131984	18-May-2005	5/260403A1	7431547	07-Oct-2008	A restraint, e.g. a corner restraint for packaging flat glass sheets, includes a first leg and a second leg joined at a vertex. Each of the legs have an outer surface having a first strap engaging position spaced from the vertex and a second strap engaging position at the vertex. The height of the first strap engaging position measure from an intermediate portion of the second surface between the first and second positions is greater than the height of the second strap engaging position. With this arrangement, the biasing force applied by a banding strap to the corner restraint reduces the biasing force applied to the vertex to reduce damage to corners of the flat glass sheets.
1637A1	METHOD OF MAKING COATED ARTICLES AND COATED ARTICLES MADE THEREBY	US	10/007382	22-Oct-2001	0108017A1	6686048B2	03-Mar-2004	A method of making a coated substrate includes providing a substrate having a functional coating with a first emissivity value, depositing a coating material having a second emissivity value over at least a portion of the functional coating prior to heating to provide a coating stack having an emissivity value greater than the emissivity value of the functional coating, and heating the coated substrate.
1637D2	COATING STACK COMPRISING A LAYER OF BARRIER COATING	US	11/752501	23-May-2007	02-0224357-A1			A coating composition that contains at least one degradable coating layer and at least one layer of barrier coating is disclosed. The coating composition can be used to make a coated substrate having improved performance over conventional coated substrates after exposure to heat and certain chemicals like halides such as chlorides, sulfur, salt, chlorine, alkali, and enamels.
1637P2	METHOD OF MAKING COATED ARTICLES AND COATED ARTICLES MADE THEREBY	US	10/387001	25-Mar-2003	0228484	7311961	25-Dec-2007	An article includes a first substrate, a functional coating deposited over a t least a portion of the substrate, and a protective coating deposited over th e functional coating. The functional coating and the protective coating define a coating stack. A polymeric material is deposited over at least a portion of the protective coating. The protective coating has a refractive index that i s substantially the same as the refractive index of the polymeric material.</S EDAB>

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1637P2/01	METHOD OF MAKING COATED ARTICLES AND COATED ARTICLES MADE THEREBY	US	11/941206	16-Nov-2007	US09-0050749-A1	8197892	12-Jun-2012	An article includes a first substrate, a functional coating deposited over at least a portion of the substrate, and a protective coating deposited over the functional coating. The functional coating and the protective coating define a coating stack. A polymeric material is deposited over at least a portion of the protective coating. The protective coating has a refractive index that is substantially the same as the refractive index of the polymeric material (IS DOAB)
1637P3	COATED ARTICLES HAVING A PROTECTIVE COATING AND CATHODE TARGETS FOR MAKING THE COATED ARTICLES	US	10/422094	24-Apr-2003	0023658A1	6916542B2	12-Jul-2005	An article includes a substrate, a functional coating deposited over the substrate, and a protective coating deposited over the functional coating. The functional coating and the protective coating define a coating stack. The protective coating provides the coating stack with an emissivity value higher than the emissivity value of the functional coating alone. The protective coating can have a thickness in the range of greater than 100 Å to less than or equal to 10 microns and a refractive index in the range of 1.4 to 2. The protective coating can include a first layer formed over the functional coating and a second layer formed over the first layer. The first layer can include 50 wt.% to 100 wt.% alumina and 50 wt.% to 0 wt.% silica, and the second layer can include 50 wt.% to 100 wt.% silica and 50 wt.% to 0 wt.% alumina. An alternating current power supply and cathode target system includes a cathode target including aluminum in the range of 5 wt.% to 90 wt.% and silicon in the range of 0 wt.% to 95 wt.%.
1637P4	METHOD OF MAKING COATED ARTICLES HAVING AN OXYGEN BARRIER COATING AND COATED ARTICLES MADE THEREBY	US	10/422095	24-Apr-2003	0023658A1	6962759B2	08-Nov-2005	An article includes a substrate, a functional coating deposited over at least a portion of the substrate, and a protective (barrier) coating deposited over at least a portion of the functional coating. The barrier coating is stable to oxygen-containing gases and limits the transmission of oxygen-containing gases to materials over which it is deposited when subjected to conditioning steps such as heating, bending, and/or tempering.
1637P5	METHODS OF CHANGING THE VISIBLE LIGHT TRANSMITTANCE OF COATED ARTICLES AND COATED ARTICLES MADE THEREBY	US	10/422099	24-Apr-2003	US-2003-0203647A1			A method is provided for changing the visible light transmittance of a coated article having a functional coating having at least one anti-reflective material and at least one infrared reflective material. The anti-reflective material includes an alloying material capable of combining or alloying with the infrared reflective material. A protective coating is deposited over the functional coating to prevent or retard the diffusion of atmospheric gas and/or vapor into the functional coating. The coated article is heated to a temperature sufficient to cause at least some of the alloying material to combine with at least some of the infrared reflective material to form a substance having a different visible light transmittance than the infrared reflective material.
1637P5/C1	METHODS OF CHANGING THE VISIBLE LIGHT TRANSMITTANCE OF COATED ARTICLES AND COATED ARTICLES MADE THEREBY	US	13/443167	10-Apr-2012	US-2012-0251819-A1	8780736	29-Jul-2014	A method is provided for changing the visible light transmittance of a coated article having a functional coating having at least one anti-reflective material and at least one infrared reflective material. The anti-reflective material includes an alloying material capable of combining or alloying with the infrared reflective material. A protective coating is deposited over the functional coating to prevent or retard the diffusion of atmospheric gas and/or vapor into the functional coating. The coated article is heated to a temperature sufficient to cause at least some of the alloying material to combine with at least some of the infrared reflective material to form a substance having a different visible light transmittance than the infrared reflective material.
1637P6	COATING STACK COMPRISING A LAYER OF BARRIER COATING	US	10/816518	01-Apr-2004	4247929A1	7232615B2	19-Jun-2007	A coating composition that contains at least one degradable coating layer and at least one layer of barrier coating is disclosed. The coating composition can be used to make a coated substrate having improved performance over conventional coated substrates after exposure to heat and certain chemicals like halides such as chlorides, sulfur, salt, chlorine, alkali, and enamels.
1657A1	METHODS OF ADJUSTING GLASS MELTING AND FORMING TEMPERATURES WITHOUT SUBSTANTIALLY CHANGING BENDING AND ANNEALING TEMPERATURES AND GLASS ARTICLES PRODUCED THEREBY	US	09/780187	09-Feb-2001	0159082	6578382B2	10-Apr-2003	A method is provided for adjusting, e.g., lowering, the melting and/or forming temperatures of a glass composition without substantially changing the bending and annealing temperatures of the glass composition. The method includes increasing the amount of CaO and decreasing the amount of MgO in the glass composition by the same or about the same amount.
1657P1	METHODS OF ADJUSTING TEMPERATURES OF GLASS CHARACTERISTICS AND GLASS ARTICLES PRODUCED THEREBY	US	09/974124	09-Oct-2001	0094938A1	6797655B2	28-Sep-2004	A method is provided for adjusting, e.g., lowering, the melting and/or forming and/or liquidus temperatures of a glass composition which can be accomplished without substantially changing the bending and annealing temperatures of the glass composition. The method includes decreasing the amount of MgO in the glass composition and increasing the amount of two or more or all of CaO, R2 O (Na2O and K2O), Al2O3 and SiO2 by the same or about the same amount.

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1680C1	PHOTO-INDUCED HYDROPHILIC ARTICLE AND METHOD OF MAKING SAME	US	11/705590	12-Feb-2007	7-0218285-A1	7960043	14-Jun-2011	Methods and articles are discussed in which a substrate is provided with a photo-induced hydrophilic surface by forming photo-induced hydrophilic coating on the substrate by spray pyrolysis, chemical vapor deposition, or magnetron sputter vacuum deposition. The coating can have a thickness of 50 Å to 500 Å, a root mean square roughness of less than 5, preferably less than 2, and photocatalytic activity of less than 3.0 x 10-3 cm-1 min-1 ? 2.0 x 10-3 cm-1 min-1. The substrate includes glass substrates, including glass sheets and continuous float glass ribbons.
1679D1/D2	VISIBLE-LIGHT-RESPONSIVE PHOTOCATIVE COATING, COATED ARTICLE, AND METHOD OF MAKING SAME	US	12/756899	29-May-2010	0238479	8012310	06-Sep-2011	A method is provided for forming a photoactive coating having a photoabsorption band in the visible region of the electromagnetic spectrum. The method includes depositing a precursor composition over at least a portion of a float gl ribbon in a molten metal bath by a CVD coating device. The precursor composition includes a titania precursor materia at least one other precursor material selected from chromium (Cr), vanadium (V), manganese (Mn), copper (Cu), iron (magnesium (Mg), scandium (Sc), yttrium (Y), niobium (Nb), molybdenum (Mo), ruthenium (Ru), tungsten (W), silver (A lead (Pb), nickel (Ni), rhenium (Re), and mixtures thereof.
1701A1	COATED SUBSTRATE HAVING A FREQUENCY SELECTIVE SURFACE	US	10/289388	11-Oct-2002	0080939A1	6730388B2	04-May-2004	A method of making a frequency selective surface on an electromagnetic energy attenuating coating having an electric resistance, including the steps of defining a first masking field and a first masking tolerance; defining a second masking and a second masking tolerance; marking selected portions of the coating within the first masking field to define a first pattern; marking selected portions of the coating within the second masking field to define a second pattern such that the first and second patterns are spaced from one another by a distance at least equal to a combined tolerance of the masking devices, and marking a strip of the coating between the first pattern and the second pattern with at least one connector segment in a manner that substantially increases the resistance of the coating strip. A coated substrate having a frequency selective surface, includes a substrate; an electromagnetic energy attenuating coating having a resistance deposited over at least a portion of the substrate; a first pattern marked in the coating; and a second pattern marked in the coating adjacent the first pattern, wherein the first pattern is separated from the second pattern by a strip of the coating configured to substantially increase the resistance of the coating strip.
1743A1	WEDGE SHAPED GLASS AND METHODS OF FORMING WEDGED GLASS	US	10/395998	25-Mar-2003	0215610A1	7122252B2	17-Oct-2006	A glass sheet includes a first edge, an opposing second edge, and an intermediate location between the first edge and second edge. The glass sheet has a first portion extending between the first edge and the intermediate location and a second portion extending between the intermediate portion and the second edge, wherein the first portion has a generally uniform thickness and the second portion has a varying thickness. The thickness of the second portion can either increase or decrease from the intermediate location to the second edge. A laminated transparency incorporating the glass sheet as well as a method of forming a glass ribbon having a changing thickness profile along at least a portion of the width of the ribbon are also discussed.
1753C1	SUBSTRATE HAVING THERMAL MANAGEMENT COATING FOR AN INSULATING GLASS UNIT	US	11/619189	11-Sep-2006	7011696?A1	7910229	22-Mar-2011	A coated article is provided for use in an IG unit. The article includes a substrate and a coating formed over at least a portion of the substrate. The coating includes a plurality of separation layers having one or more dielectric layers and a plurality of infrared reflective layers. The coating can be positioned on the #2 or #3 surface of the IG unit and can provide a reference solar heat gain coefficient of less than or equal to 0.35.
1761A1	ARTICLE HAVING AN AESTHETIC COATING	US	10/440973	05-May-2003	0224181	7588829	15-Sep-2009	An article, e.g., a vehicle transparency, includes a first substrate and at least one aesthetic coating deposited over at least a portion of the substrate. The at least one aesthetic coating provides the article with a color defined by -10 ≤ a* ≤0 and -15 ≤ b* ≤ 5 and a reflectance in the range of 5% to 97%.
1772A1	BLUE-GREEN GLASS	US	10/198774	18-Jul-2002	0014567A1	6849568B2	01-Feb-2005	A blue-green colored glass composition includes a base portion, such as a conventional soda-lime-silica base, and major colorants. In one embodiment, the major colorants include 0.7 to 0.9 weight percent total iron (Fe_2O_3), 0.2 to 0.3 weight percent FeO, and 0 to 5 ppm CoO. The glass is characterized by a dominant wavelength in the range of 490 nm to 495 nm and an excitation purity in the range of 3% to 11%. The glass of the invention can be essentially free of Se.
1773C2	Article Having Nano-Scaled Structures and a Process for Making Such Article	US	12/413944	30-Mar-2009	US-2009-0239048-A1	7851016	14-Dec-2010	A process for producing an article having modified optical, chemical, and/or physical properties is disclosed. The process includes (a) fluidizing a starting material, (b) forcing the fluidized starting material toward the article, and (c) passing the fluidized starting material through a high energy zone. The passing step can occur before the forcing step, after the forcing step but before the fluidized material comes in contact with the surface of the article, and/or after the forcing step and after the fluidized material comes in contact with the surface of the article. The properties of the article are modified because the article has nano-scaled structures distributed on the surface of the article and/or at least partially embedded in the article.

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1773P2	NANOSTRUCTURED COATINGS AND RELATED METHODS	US	11/543644	05-Oct-2006	0087187	8679580	25-Mar-2014	A coated substrate and methods for making the coated substrate are disclosed. The method entails depositing an undercoating over at least a portion of the substrate; fluidizing a precursor for nanoparticles; and forcing the fluidized precursor toward the substrate to coat the undercoating with a layer of nanoparticles. Coated substrates according t present invention exhibit improved durability and increased photocatalytic activity.
1787A1	METHOD FOR MAKING FLOAT GLASS HAVING REDUCED DEFECT DENSITY	US	10/672025	26-Sep-2003	0110625	7162892	16-Jan-2007	A method for reducing the defect density of glass comprising melting a glass composition comprising from 65-75 wt SiO2; from 10-20 wt % of Na2O; from 5-15 wt % of CaO; from 0-5 wt % of MgO; from 0-5 wt % of Al2O3; from 0-5 w K2O; from 0-2 wt % Fe2O3; and from 0-2 % FeO; wherein the glass composition has a total heat strength index of g than or equal to 1.23 is disclosed.
1797C1	APPARATUS AND METHODS FOR PRODUCING FLOAT GLASS HAVING REDUCED DEFECT DENSITY	US	11/750194	08-Jun-2007	0027190			A float glass chamber and related methods include a hot section having an atmosphere at or least its lower portion less than 3 percent hydrogen based on volume and a cold section having a different volume percent hydrogen.
1797D1	METHOD FOR MAKING FLOAT GLASS HAVING REDUCED DEFECT DENSITY	US	11/584265	20-Oct-2006	70037608-A1	7414006	19-Aug-2008	A method for reducing the defect density of glass comprising melting a glass composition comprising from 65-75 wt SiO2; from 10-20 wt % of Na2O; from 5-15 wt % of CaO; from 0-5 wt % of MgO; from 0-5 wt % of Al2O3; from 0-5 w K2O; from 0-2 wt % Fe2O3; and from 0-2 % FeO; wherein the glass composition has a total heat strength index of greater than or equal to 1.23 is disclosed.
1798A1	HEATABLE ARTICLE HAVING A CONFIGURED HEATING MEMBER	US	10/264106	03-Oct-2002	0068351A1	7130582	07-Nov-2006	A heatable article, e.g. a heatable windshield, having a generally trapezoidal shape has a conductive member, e.g. a conductive coating, between and in contact with a pair of spaced bus bars having different lengths. Selected portions of the coating between the bus bars are segmented to reduce the difference in watt density between the coatings at the bus bars when current arrows through the coating. In one non-limiting embodiment, the width of the segments at the longer bus bar is less than the width of the segments at the longer bus bar. With this configuration, the watt density at the bottom of the windshield is increased to more efficiently remove ice and snow. In another non-limiting embodiment, the coating has a communication window to pass frequencies of the electromagne ic spectrum, e.g. RF frequencies, to obtain information from within the vehicle. The coating surrounding the conduc ive window has break lines to segment the coa ing to eliminate hot spot around the pe phery of the communication window.
1817A1	WATER REPELLENT SURFACE TREATMENT AND TREATED ARTICLES	US	10/328804	24-Dec-2002	0121162	6811864B2	02-Nov-2004	A method is provided for applying a water repellent coating over a substrate surface. The surface is contacted with at least one coating composition including at least one perfluoroalkylalkylsilane, at least one hydrocyzable primer, e.g., a silane and/or siloxane, and at least one non-halogenated, e.g., non-fluorinated, alkylsilane. The perfluoroalkylalkylsilane and non-fluorinated alkylsilane can be selected such that the effective chain length of the non-fluorinated alkylsilane is equal to or longer than the effective chain length of the perfluoroalkylalkylsilane.
1840C1	SUBSTRATES COATED WITH MIXTURES OF TITANIUM ALUMINUM MATERIALS	US	11/706459	14-Feb-2007	7-0031501-A1	8597474	03-Dec-2013	Titanium and aluminum cathode targets are disclosed for sputtering absorbing coatings of titanium and aluminum-containing materials in atmospheres comprising inert gas, reactive gases such as nitrogen, oxygen, and mixtures thereof, which can for her comprise inert gas, such as argon, to form nitrides, oxides, and oxynitrides, as well as metallic films. The titanium and aluminum-containing coatings can be utilized as an outer coat or as one or more coating layers of a coating stack.
1844a1	CONDUCTIVE FREQUENCY SELECTIVE SURFACE UTILIZING ARC AND LINE ELEMENTS	US	10/409618	08-Apr-2003	0200821	6891517B2	10-May-2005	An electrically conductive coa ing of an automotive heatable windshield has a communication window having an enhanced frequency selective surface having arranged passing areas (uncoated areas) and blocking areas (coated areas) to pass and block, respectively, predetermined wavelengths of the electromagnetic spectrum. In one non-lim ing embodiment, the frequency selective surface includes a pattern having a first plurality of arcuate break lines on one side of a dividing break line and a second plurality of arcuate break lines on the other side of the dividing break line. An elongated continuous blocking area is between adjacent break lines. The arcuate break lines of a group are nested within one another with the arcuate break line having the largest radius of curvature adjacent he dividing break line. The break lines each have alternating blocking and passing areas. In another embodiment, the enhanced frequency selective surface has a plurality columns spaced from one another by a continuous elongated blocking area. Each of the columns includes passing areas with each of the passing areas have a perimeter with a blocking area in the perimeter spaced from the perimeter. The perimeters of the passing areas contact one another with the blocking area of adjacent passing areas spaced from one another. The elongated blocking area between the break lines and columns extend to the perimeter of the communication window. In this manner current passing through the coating, passes through the communication window to eliminate hot and cold spots around and within the perimeter of the communication window.

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1844D1	CONDUCTIVE FREQUENCY SELECTIVE SURFACE UTILIZING ARC AND LINE ELEMENTS	US	11/093823	30-Mar-2005	6/0267866A1	7190326B2	13-Mar-2007	An electrically conductive coating of an automotive heatable windshield has a communication window having an enh frequency selective surface having arranged passing areas (uncoated areas) and blocking areas (coated areas) to pa block, respectively, predetermined wavelengths of the electromagnetic spectrum. In one nonlimiting embodiment, th frequency selective surface includes a plurality columns spaced from one another by a continuous elongated blocking Each of the columns includes passing areas with each of the passing areas have a perimeter with a blocking area in perimeter spaced from the perimeter. The perimeters of the passing areas contact one another with the blocking are adjacent passing areas spaced from one another. The elongated blocking area between the busbar base and column extend to the perimeter of the communication window. In this manner current passing through the coating, passes th the communication window to eliminate hot and cold spots around and within the perimeter of the communication wi
1857A1	TRANSPARENT GLASS HAVING BLUE EDGE COLOR	US	10/438134	14-May-2003	0029743	6962887B2	08-Nov-2005	A method is provided for making clear glass having an above edge corrosion and low amber surface corrosion in a r vacuum float glass system. The method includes processing batch materials in a non-vacuum float glass system to p a float glass product including: SiO2 65-75 wt.%; Na2O 10-20 wt.%; CaO 5-15 wt.%; MgO 0-5 wt.%; Al2O3 0-5 wt.%; 0-5 wt.%; and a colorant portion having iron (Fe2O3) of 0-0.02 wt.%, CoO of 0-5 ppm, NiO2 of 0-0.1 wt.%, and of 0-0.05 wt.%. The glass has a redox ratio in the range of 0.2 to 0.5, and can have a retained surface content of less equal to 0.2 wt.%, such as less than or equal to 0.1 wt.%.
1859C1	APPLIANCE WITH COATED TRANSPARENCY	US	11/748896	15-May-2007	US07-0275253-A1	7556868	07-Jul-2009	An appliance transparency, such as an oven transparency, includes at least one substrate and a coating deposited o least a portion of the substrate. The coating includes at least one metal layer, such as a metallic silver layer. The meta layer can have a thickness in the range of 80 Angstroms to 100 Angstroms and optionally or the coating can have a protective coating deposited thereon.
1859C2	APPLIANCE WITH COATED TRANSPARENCY	US	12/368852	10-Jun-2009	US-2009-0258208-A1	7897273	01-Mar-2011	An appliance transparency, such as an oven transparency, includes at least one substrate and a coating deposited over at least a portion of the substrate. The coating includes at least one metal layer, such as a metallic silver layer. The metal layer can have a thickness in the range of 80 Å to 100 Å and optionally or the coating can have a protective coating deposited thereon.
1859C3	APPLIANCE WITH COATED TRANSPARENCY	US	12/486865	18-Jun-2009	US-2009-0252964-A1	8003233	23-Aug-2011	An appliance transparency, such as an oven transparency, includes at least one substrate and a coating deposited over at least a portion of the substrate. The coating includes at least one metal layer, such as a metallic silver layer. The metal layer can have a thickness in the range of 80 Å to 100 Å and optionally or the coating can have a protective coating deposited thereon.
1859P1	APPLIANCE WITH COATED TRANSPARENCY	US	12/187438	07-Aug-2008	US-2009-0197067-A1	7968502	16-Aug-2011	An appliance transparency, such as an oven transparency, includes at least one substrate and a coating deposited over at least a portion of the substrate. The coating includes at least one metal layer, such as a metallic silver layer. The metal layer can have a thickness in the range of 80 Angstroms to 100 Angstroms and optionally or the coating can have a protective coating deposited thereon.
1864A3	METHOD OF MAKING AN INTEGRATED WINDOW SASH	US	10/874439	23-Jun-2004	5/0284569A1	7988823	15-Sep-2009	A method of making an integrated window sash includes providing a sash frame having a first sheet supporting surface, a second sheet supporting surface, and a base extending from the first sheet supporting surface to toward the second sheet supporting surface; applying a layer of an adhesive sealant having a low gas and moisture permeability on the first sheet supporting surface; applying a layer of an adhesive sealant having a low gas and moisture permeability on the second sheet supporting surface; applying a layer of a moisture pervious matrix having a desiccant therein on the base; moving a first sheet having a first major surface and an opposite second major surface into the spacer frame over and spaced from the matrix to move the first major surface of the first sheet against the first layer, and moving a second sheet having a first major surface and an opposite major surface toward the second layer to move the first major surface of the second sheet against the second layer, wherein the first surface of the second sheet is spaced from the second surface of the first sheet to provide a compartment therebetween and the desiccant is in communication with the compartment.
1864A4	INTEGRATED WINDOW SASH WITH LATTICE FRAME AND RETAINER CUP	US	10/874508	23-Jun-2004	5/0284568A1	7765768	03-Aug-2010	An insulating unit includes a first and a second sheet, each of the sheets having a first major surface and an opposite second major surface; an arrangement to position the first and second sheets in spaced relation to one another to provide a compartment between the sheets, the second major surface of the first sheet and the first major surface of the second sheet facing the compartment; a lattice made of materials in the compartment, the lattice having end portions adjacent to and spaced from the arrangement; and a retainer cup having a first end portion connected to an end portion of the lattice and the opposite second end portion having a compressible base, the compressible base in surface contact with the second major surface of the first sheet and the first major surface of the second sheet to retain the lattice in position between the sheets.

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1910D1	HIGH PERFORMANCE BLUE GLASS	US	11/713197	02-Mar-2007	0214833	7691765	06-Apr-2010	A glass composition for forming a blue tinted glass is disclosed. The glass composition is made up of a base glass portion, iron oxide, and at least one first additive compound selected from Nd2O3 in an amount up to 1 weight percent and/or CuO in an amount up to 0.5 weight percent. The base glass portion has the following components: SiO2 from 6 75 weight percent; Na2O from 10 to 20 weight percent; CaO from 5 to 15 weight percent; MgO from 0 to 5 weight perce Al2O3 from 0 to 5 weight percent; B2O3 from 0 to 5 weight percent; and K2O from 0 to 5 weight percent. The total iro the glass composition ranges from 0.3 to 1.2 weight percent, and the glass composition has a redox ratio ranging from to 0.65.
1924D1	METHODS FOR FORMING AN ELECTRODEPOSITED COATING OVER A COATED SUBSTRATE AND ARTICLES MADE THEREBY	US	11/751335	21-May-2007	07-0224404-A1			A coated article includes a non-conductive substrate, such as glass. At least one conductive coating is formed over at a portion of the substrate, such as by chemical vapor deposition or physical vapor deposition. The conductive coating be a functional coating and can have a thickness in the range of greater than 0 Å to less than 25,000 Å , such as less 15,000 Å. At least one polymeric coating is electrodeposited over at least a portion of the conductive coating.
1931A1	EFFECTS OF METHODS OF MANUFACTURING SPUTTERING TARGETS ON CHARACTERISTICS OF COATINGS	US	11/112595	22-Apr-2005	0259390	9051211	09-Jun-2015	Titanium and aluminum carbide targets are disclosed for sputtering absorbing coatings of titanium and aluminum-containing materials in atmospheres comprising inert gas, reactive gases such as nitrogen, oxygen, and mixtures there which can for the comprise inert gas, such as argon, to form nitrides, oxides, and oxynitrides, as well as metallic films. titanium and aluminum-containing coatings can be utilized as an outer coat or as one or more coating layers of a coatin stack.
1932D1	HYBRID COATING STACK	US	11/758664	01-Jun-2007	US07-0281184-A1	7846718	19-Jan-2010	A coating includes a functional coating, such as a solar control coating having at least one metal layer. A topcoat is formed over at least a portion of the functional coating. The topcoat includes a first topcoat layer having a thickness in the range of 0.5 QWOT to 1.5 QWOT with respect to a reference wavelength of 550 nm and a first refractive index, and a second topcoat layer having a thickness in the range of 0.5 QWOT to 1.5 QWOT with respect to a reference wavelength of 550nm and a second refractive index different from the first refractive index.
1935A1	MSVD COATING PROCESS	US	10/841986	06-May-2004	5247925A1	8500965	06-Aug-2013	The present invention is a method of coating a substrate in a single zone of a MSVD coater wherein the zone includes at least two bays, comprising running a first bay of a zone including a first target in metal mode and running the second bay including a second target in transition or oxide mode, wherein the %O of formation of the target oxide being run in transition mode or oxide mode is equal to or less than +150 kcal/mole O2 or the difference in %O between the target being run in transition mode or oxide mode and the target being run in metal mode is at least 50 kcal/mole O2.
1961A1	COATED SUBSTRATES THAT INCLUDE AN UNDERCOATING	US	10/914356	09-Aug-2004	0029613	7491962	07-Oct-2008	A coated substrate is disclosed. The coated substrate includes a substrate; an undercoating having one or more materials selected from tin oxide, silica, titania, alumina, zirconia, zinc oxide and alloys and mixtures thereof nitrides of titanium, zirconium, hafnium, silicon, aluminum and mixtures thereof oxynitrides of titanium, zirconium, hafnium, silicon, aluminum and mixtures thereof overlaying at least a portion of the substrate; and a functional coating overlaying at least a portion of the undercoating. As a result of the undercoating, the coated substrate can exhibit improved properties such as improved aesthetic properties, increased durability, photocatalytic activity, mechanical durability, etc.
1971C1	METAL BASED COATING COMPOSITION AND RELATED COATED SUBSTRATES	US	11/712240	28-Feb-2007	0218311	7923131	12-Apr-2011	A coated substrate is disclosed. The coated substrate includes a substrate and a coating composition over the substrate comprising at least one metal based layer selected from tungsten, chromium, tantalum, molybdenum, aluminum, niobium, and mixtures and alloys thereof, and mixtures and alloys of cobalt and chromium; and at least one dielectric layer including SixNy where x/y ranges from 0.75 to 1.5, over the metal based layer. The "E(cmc (1.5:1) (T), "E(cmc (1.5:1) (R1) and "E(cmc (1.5:1) (R2) of a non-heat treated, coated substrate as compared to a heat treated, coated substrate according to the present invention are no greater than 8 units.
1971D1	METAL BASED COATING COMPOSITION AND RELATED COATED SUBSTRATES	US	13/053476	22-Mar-2011	US-2011-0170176-A1	8329318	11-Dec-2012	A coated substrate is disclosed. The coated substrate includes a substrate and a coating composition over the substrate comprising at least one metal based layer selected from tungsten, chromium, tantalum, molybdenum, aluminum, niobium, and mixtures and alloys thereof, and mixtures and alloys of cobalt and chromium; and at least one dielectric layer including SixNy where x/y ranges from 0.75 to 1.5, over the metal based layer. The "E(cmc (1.5:1) (T), "E(cmc (1.5:1) (R1) and "E(cmc (1.5:1) (R2) of a non-heat treated, coated substrate as compared to a heat treated, coated substrate according to the present invention are no greater than 8 units.
2011A1	BLUE GLASS COMPOSITION	US	11/055194	10-Feb-2005	6778255A1	7625830	01-Dec-2009	The present invention provides a blue glass that can be essentially free of selenium and cobalt but it has a blue color and desired luminous transmittance. Additionally, the amount of iron present is comparable to conventional soda-lime-silica glass. The glass of the present invention can have a soda-lime-silica glass base portion, with major colorants that provide the blue color.

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2021D1	SUBSTRATES COATED WITH A MULTI-FILM FUNCTIONAL COATING	US	12/246596	07-Oct-2008	US-2009-0123736-A1	7897235	11-Jan-2011	A method for forming a coated substrate is disclosed. The method comprises depositing an undercoating layer and depositing a functional coating comprising a material which can be present in more than one crystal structure over the undercoating layer, wherein there is a critical deposition thickness at which the functional coating transforms from a first polycrystalline film made up predominantly of the material having a first crystal structure to a second polycrystalline film made up predominantly of the same material having a second crystal structure.
2022A1	COATING COMPOSITION WITH SOLAR PROPERTIES	US	11/084988	21-Mar-2005	6210809A1	7473471	06-Jan-2009	A coating composition is disclosed. The coating composition includes an infrared reflective layer, a primer layer over t infrared reflective layer, a dielectric layer over the primer layer, and an absorbing layer, wherein the absorbing layer ca either under the infrared reflective layer or over the dielectric layer.
2022D1	METHOD OF COATING A SUBSTRATE WITH A COATING COMPOSITION HAVING SOLAR PROPERTIES	US	12/330717	09-Dec-2008	US-2009-0104386-A1	7713587	11-May-2010	A coating composition is disclosed. The coating composition includes an infrared reflective layer, a primer layer over t infrared reflective layer, a dielectric layer over the primer layer, and an absorbing layer, wherein the absorbing layer ca either under the infrared reflective layer or over the dielectric layer.
2022D1D2	METHOD OF MANUFACTURING A COATED SUBSTRATE HAVING SOLAR PROPERTIES	US	12/785419	20-Apr-2010	US-2010-0203339-A1	8974864	10-Mar-2015	A method of coating a substrate is disclosed. The method includes providing a substrate; depositing an infrared refle layer over at least a portion of a substrate; depositing a primer layer over at least a portion of the infrared reflective lay depositing a dielectric layer over at least a portion of the primer layer; and forming an absorbing layer. The absorbing l includes an alloy and/or mixture of (a) a metal having an index of refraction at 500 nm less than or equal to 1.0 and (b) ... material having a ?G/? of greater than or equal to - 1x10 at 1900?K. The metal can be silver and the material can be Si.
2023A1/D1	METAL NANOSTRUCTURED COLORANTS FOR HIGH REDOX GLASS COMPOSITION	US	12/017211	21-Jan-2008	US08-0153549-A1	7659221	09-Feb-2010	A colorant for a high redox glass composition comprising: total iron (Fe_2O_3) 0 to 1.1 weight percent; and from 0.0001 to 0.15 weight percent of at least one of the following: Cu nanostructures, Au nanostructures, or Ag nanostructures, wherein the weight percents are based on the total weight of the glass composition. The colorant of the invention can be used to make glass compositions having various colors.
2040A1	ON-LINE/OFF-LINE SCORING BRIDGE	US	11/129963	16-May-2005	06/0258089	7389784	15-Apr-2008	A scoring bridge includes a plurality of moveable mounted carriages. The carriages each have a roller, and the bridge has a linear stator to move the carriages. The position of a carriage designated as a reference carriage is recorded as it moves past a motion detector. The position of each remaining carriage is recorded as they individually move past the detector. The difference between the position of a carriage and the position of the reference carriage is an offset that is added to the positon reading of the carriage to accurately space the carriage from the reference carriage. Each of the carriages can have a scoring assembly that includes servomotor acting through a gear arrangement on a scoring wheel. The servomotor applies a constant load to the scoring wheel and adjusts the load for any positive or negative displacement of the scoring wheel from a reference position.
2051A1	HEATABLE WINDSHIELD	US	11/185471	20-Jul-2005	07/0020465A-1	7335421	26-Feb-2008	A heatable transparency includes a first ply having a No. 1 surface and a No. 2 surface and a second ply having a No. 3 surface and a No. 4 surface. The No. 2 surface faces the No. 3 surface. An electrically conductive coating is formed on at least a portion of the No. 2 or No. 3 surface, with the conductive coating including three or more metallic silver layers. An anti-reflective coating is formed on the No. 4 surface.
2052A1	SIMULATED HIGH REFRACTIVE INDEX GLASS	US	11/192829	29-Jul-2005	7/0025900-A1	7547108	16-Jun-2009	A method for modifying the appearance of a substrate is disclosed. The method includes providing a substrate having first and second opposing surfaces and depositing a reflectance modifying coating on at least a portion of the first surface of the substrate, wherein the second surface has a visible light reflectance (R1) ranging from 5 to 20 percent.
2053A1	GREEN GLASS COMPOSITION	US	11/182487	29-Jul-2005	7/0027021-A1	7671732	16-Mar-2010	A glass composition that includes a base glass composition including: SiO_2 from 65 to 75 weight percent, Na_2O from 10 to 20 weight percent, CaO from 5 to 15 weight percent, MgO from 0 to 5 weight percent, Al_2O_3 from 0 to 5 weight percent, K_2O from 0 to 5 weight percent, and a colorant and property modifying portion including total iron ranging from of equal to or less than 0.6 weight percent; and TiO_2 ranging from 0.1 to 1.0 weight percent, wherein the redox ratio ranges from 0.33 to 0.45 and the weight percents are based on the total weight of the composition.
2073A1	GRAY GLASS COMPOSITION	US	11/265393	02-Nov-2005	0099769-A1	7666801	09-Sep-2009	A glass composition that includes a base glass composition including: SiO_2 from 65 to 75 weight percent, Na_2O from 10 to 20 weight percent, CaO from 5 to 15 weight percent, MgO from 0 to 5 weight percent, Al_2O_3 from 0 to 5 weight percent, K_2O from 0 to 5 weight percent and BaO from 0 to 1 weight percent, and a colorant and property modifying portion including total iron from 0.5 to 0.8 weight percent, Er_2O_3 from 0.05 to 0.5 weight percent, Se from 1 PPM to 4 PPM, and CoO from 1 PPM to 15 PPM, wherein the glass composition has a redox ratio ranging from 0.25 to 0.36.

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2074A1	GRAY GLASS COMPOSITION	US	11/264908	02-Nov-2005	0099768-A1	7666806	23-Feb-2010	A glass composition that includes a base glass composition including: SiO2 from 65 to 75 weight percent, Na2O fro 20 weight percent, CaO from 5 to 15 weight percent, MgO from 0 to 5 weight percent, Al2O3 from 0 to 5 weight per K2O from 0 to 5 weight percent and BaO 0 to 1 weight percent, and a colorant and property modifying portion includ ing from 0.25 to 0.9 weight percent, CoCO3 from 6 PPM to 400 PPM, Er2O3 from 0.3 to 9.0 weight percent, and TiO 0.1 to 0.6 weight percent, wherein the glass composition has a redox ratio ranging from 0.15 to 0.62.
2080A1	APPARATUS AND METHOD FOR TEMPERING GLASS SHEETS	US	11/298706	29-Nov-2005	7101622930-A1	8234883	07-Aug-2012	A method of tempering a glass sheet heated to a tempering temperature includes cooling the glass sheet at a first h transfer coefficient at a first quench station and cooling the glass sheet at a second heat transfer coefficient at a sec quench station downstream of the first quench station. The second heat transfer coefficient is greater than the first h transfer coefficient. In a multistage process of the invention, a plurality of quench stations could be used with each downstream quench station having a larger heat transfer coefficient than the previous upstream quench station.
2084A1	DISPLAY PANEL	US	11/655141	18-Jan-2007	7315678-A1	8547705	01-Oct-2013	The present invention discloses a display panel 10 having a substrate 12 with one or more surfaces and one or mor features 30 within the substrate 12. When one or more surfaces of the substrate 12 are illuminated, the features 30 the illumination to form an image.
2084P1	DISPLAY PANEL	US	13/741131	18-Jan-2013	0290784	9629610	18-Jan-2014	The present invention discloses a display panel 10 having a substrate 12 with one or more surfaces and one or more features 30 within the substrate 12. When electromagnetic radiation is introduced at or directed toward one or more surfaces of the substrate 12, the features 30 redirect the electromagnetic radiation in one or more predetermined directions.
2096A1	COLORED GLASS COMPOSITIONS	US	11/831287	12-Jan-2008	7315161482-A1	7825151	02-Nov-2010	A glass composition is disclosed. The glass composition includes base glass composition including SiO2 from 65 to 75 weight percent, Na2O from 10 to 20 weight percent, CaO from 5 to 15 weight percent, MgO from 0 to 5 weight percent, Al2O3 from 0 to 5 weight percent, K2O from 0 to 5 weight percent, and BaO from 0 to 1 weight percent, and a colorant and property modifying portion including total iron from up to 0.02 weight percent, CeO2 from 0.05 weight percent to 1.5 weight percent, CoO up to 50 PPM, Se up to 15 PPM, Cr2O3 up to 500 PPM, CuO up to 0.5 weight percent, V2O5 up to 0.5 weight percent, TiO2 up to 1 weight percent, NiO up to 500 PPM, Er2O3 up to 5 weight percent, MnO2 up to 0.6 weight percent, and Nd2O3 up to 2 weight percent, wherein the glass composition has a redox ratio up to 0.65.
2097A1	METHOD OF PRODUCING PARTICLES BY PHYSICAL VAPOR DEPOSITION IN AN IONIC LIQUID	US	11/654252	17-Jan-2007	US-2010-0267549-A1	8354355	15-Jan-2013	A method is provided for producing particles, such as nanoparticles. The method includes introducing an ionic liquid into a deposition chamber, and directing one or more material toward or depositing one or more materials onto the ionic liquid by physical vapor deposition to form nanoparticles in the ionic liquid.
2100D1	COATED SUBSTRATES HAVING UNDERCOATING LAYERS THAT EXHIBIT IMPROVED PHOTOCATALYTIC ACTIVITY	US	13/349697	13-Jan-2012	US-2012-0114946-A1			A coated substrate is disclosed. The coated substrate includes a substrate; an undercoating layer comprising at least one layer selected from a mixture of silica and zirconia, a mixture of silica and titanium, or a mixture of silica, zirconia and titania overlaying at least a portion of the substrate; and a functional coating overlaying at least a portion of the undercoating. The coated substrates of the invention exhibit improved properties such as increased durability, photocatalytic activity, etc. as a result of the undercoating layer.
2107A1	LOW SOLAR ABSORBING BLUE GLASS, SOLAR REFLECTING COATED BLUE GLASS, AND INSULATING UNIT HAVING A LOW SOLAR HEAT GAIN	US	11/692239	26-Mar-2007	0243369	8268741	18-Sep-2012	An insulating unit having a neutral grey color and a solar heat gain coefficient less than 0.40 includes a clear glass sheet spaced from a coated glass sheet. The coated glass sheet includes a colored glass substrate having a solar infrared reflective coating. The composition of the coated substrate includes a base glass portion and a glass colorant portion, the glass colorant portion including total iron in the range of 0.04 to less than 0.28 weight percent, CoO in the range of 32 to 90 parts per million, and Se in the range of greater than 0 to less than 5.5 parts per million. In one non-limiting embodiment of the invention the glass substrate at a thickness of 0.223 inches has a* chromaticity coordinates of -8.5 to +2.5 and b* chromaticity coordinates of -1 to -15, and a visible light transmittance of 40 to 80%.
2107B1	LOW SOLAR ABSORBING BLUE GLASS, SOLAR REFLECTING COATED BLUE GLASS, AND INSULATING UNIT HAVING A LOW SOLAR HEAT GAIN	US	13/599363	30-Aug-2012	US-2013-0315410-A1	9458056	04-Jun-2013	An insulating unit having a neutral grey color and a solar heat gain coefficient less than 0.40 includes a clear glass sheet spaced from a coated glass sheet. The coated glass sheet includes a colored glass substrate having a solar infrared reflective coating. The composition of the coated substrate includes a base glass portion and a glass colorant portion, the glass colorant portion including total iron in the range of 0.04 to less than 0.28 weight percent, CoO in the range of 32 to 90 parts per million, and Se in the range of greater than 0 to less than 5.5 parts per million. In one non-limiting embodiment of the invention the glass substrate at a thickness of 0.223 inches has a* chromaticity coordinates of -3.5 to +2.5 and b* chromaticity coordinates of -1 to -15, and a visible light transmittance of 40 to 80%.

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2112C1	ANTIREFLECTIVE COATING AND SUBSTRATES COATED THEREWITH	US	13/472530	16-May-2012	US-2012-0070640-A1			An antireflective coating includes a first high index of refraction coating layer, a first low index of refraction coating layer over the first high index of refraction coating layer, a second high index of refraction coating layer over the first low index of refraction coating layer, and a second low index of refraction coating layer over the second high index of refraction coating layer.
2162A1	COATED NON-METALLIC SHEET HAVING A BRUSHED METAL APPEARANCE, AND COATINGS FOR AND METHOD OF MAKING SAME	US	11/633009	14-Dec-2006	US08-0145861-A1	7736750	15-Jun-2010	An article includes a substrate, e.g. a glass sheet having a first major surface and an opposite second major surface th a textured surface to provide a predetermined pattern on the second surface of the substrate, and an overlay, e.g. a co over the pattern. The percent of visible light transmittance, and percent visible light reflectance, of the substrate and th overlay is selected such that the pattern is visible when the article is viewed through one of the surfaces of the substrat overlay. In one non-limiting embodiment, the substrate is glass and the article has a metallic appearance. In another n limiting embodiment, the overlay is a transparent coating deposited on the second surface of the glass sheet into groov the pattern. Other non-limiting embodiments include the substrate having a Delta % haze of greater than 15%, and a protective overcoat over the coating.
2163A1	AUTOMOTIVE WINDOW INTERLAYER WITH SOLAR CONTROL PROPERTIES	US	11/652748	12-Jan-2007	US08-0171808-A1	8530542	10-Sep-2013	A method for forming an interlayer having improved solar control properties is disclosed. The method includes: a) formi polymer material from a reaction mixture, b) adding one or more solar control components to the reaction mixture while polymer material is being formed, and c) curing the reaction mixture.
2164A1	METHOD FOR FORMING A LAMINATED WINDOW THAT CAN EXHIBIT A VARIABLE LEVEL OF ADHESION	US	11/652750	12-Jan-2007	US08-0171210-A1	7854814	21-Dec-2010	A method for forming a laminated window having one or more interlayers that can exhibit a variable level of adhesion is disclosed. The method includes: a) assembling a cast between two plies that make up the laminated window; b) filling the cast with a reaction mixture for forming a polymer material; c) adding at least one first silane comprising an isocyanate functional silane and at least one second silane comprising an epoxy silane to the reaction mixture; and d) curing the reaction mixture.
2165A1	WINDOW INTERLAYER WITH SOUND ATTENUATION PROPERTIES	US	11/652751	12-Jan-2007	US08-0171198-A1			The present invention discloses a method for forming a laminated window. The method includes: a) assembling a mold between two plies that make up a laminated window; b) filling the mold with a reaction mixture having: (1) at least one chain extender; (2) at least one polyether polyol having a molecular weight of approximately 1,000; and (3) at least one aliphatic polyisocyanate; and c) curing the reaction mixture.
2203A1	ARTICLE SHIPPING AND/OR STORAGE CONTAINER AND A SHIPPING AND/OR STORAGE CONTAINER HAVING ARTICLES	US	11/741022	25-Apr-2007	US08-0284825-A1	7954885	08-Feb-2011	A sheet shipping and storage container includes a base supporting a stack of glass sheets in a vertical orientation, and a pair of telescoping end caps mounted on each side of the stack in facing relationship to one another. A first endless strap has its course around the end caps to bias the end caps toward one another about the stack; a second endless strap has it course around back end of each end caps and the back side of the stack to bias the back surface of the stack and the end caps downward toward the front of the base, and a third endless strap around the opposite end of the end caps and the front side of the stack to bias the end caps and the front side of the stack downward toward back side of the base to urge the proximity of sheets, end caps and base.
2209A1	VEHICLE TRANSPARENCY HEATED WITH ALTERNATING CURRENT	US	11/748286	09-May-2007	US08-0277320-A1	8686319	01-Apr-2014	A heatable transparency comprises a substrate and an electrically conductive coating formed over at least a portion of the substrate. A power supply is in contact with the conductive coating. The power supply is configured to provide alternating current (AC) to the conductive coating.
2224A1	APPLIANCE TRANSPARENCY	US	12/134262	06-Jun-2008	US-2009-0142602-A1	8728634	20-May-2014	A transparency includes a substrate having a first major surface and a second major surface. A first coating is provided over at least a portion of the first major surface, the first coating including one or more metal oxide layers. A second coating is provided over at least a portion of the second major surface, the second coating including one or more metallic layers.
2237A1	SOLAR CONTROL COATING WITH HIGH SOLAR HEAT GAIN COEFFICIENT	US	12/774794	06-May-2010	US-2011-0117360-A1			A coating provides a high solar heat gain coefficient (SHGC) and a low overall heat transfer coefficient (U-value) to trap and retain solar heat. The coating and coated articles are particularly useful for use in architectural transparencies in northern climates. The coating includes a first dielectric layer, a continuous metallic layer formed over at least a portion of the first dielectric layer, the metallic layer having a thickness less than 8 nm; a primer layer formed over at least a portion of the metallic layer; a second dielectric layer formed over at least a portion of the primer layer; and an overcoat formed over at least a portion of the second dielectric layer. When used on a No. 3 surface of a reference IGU, the coating provides a SHGC of greater than or equal to 0.6 and a U-value of less than or equal to 0.36.
9198	MULTILAYER HEAT PROCESSABLE VACUUM COATINGS WITH METALLIC PROPERTIES	US	07/798606	10-May-1988		6274264B1	14-Aug-2001	A temperable coated article with metallic properties is prepared by coating a glass substrate with a metal containing film such as titanium nitride, which ordinarily oxidizes at high temperature, overcoating with a protective layer of a silicon compound which forms a durable layer and prevents oxidation of the underlying metal-containing film and undercoating with a stabilizing metal-containing layer. The coated article can be tempered without losing its metallic properties to oxidation.

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6311	REACTIVE SPUTTERING OF SILICON AND TRANSITION METAL	US	07/981,709	25-Nov-1992		6139969	31-Oct-2000	Low absorbance coatings of silicon-nickel alloy in the form of oxides, nitrides and oxynitrides are disclosed along with a me hod for producing them by sputtering silicon-nickel targets comprising 3 to 18 weight percent nickel in atmospheres comprising reactive gases such as nitrogen, oxygen and mixtures thereof which may further comprise non gas such as argon. The presence of nickel in the range of 3 to 18 weight percent provides target stability and enhanced sputtering r over target of silicon alone or alloyed with aluminum, while maintaining a low refractive index and low absorbance, not when sputtering in oxygen to produce an oxide coating, but also when sputtering in nitrogen or a mixture of nitrogen an oxygen to produce coatings of silicon-nickel nitride or oxynitride respectively.
9359	METHOD OF MAKING CATHODE TARGETS COMPRISING SILICON	US	08/042186	02-Apr-1993		5366278	22-Oct-1994	A method for bonding silicon-containing compositions to metal surfaces is disclosed wherein a coarse silicon-containing surface is arc-sprayed with a first adhesive layer, a second solderable layer, and a third solder layer, and the arc-spray surface is then soldered to the metal surface. The me hod is particularly useful for producing silicon-containing targets cathode sputtering.

Schedule A, Part 2 - Expired/Abandoned Flat Glass Patents

Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
07035316V1	ALKALI BARRIER LAYER	US	61/164047	27-Mar-2009				
08035530V1	ANTIMONY DOPED METAL OXIDE COATINGS	US	61/729058	13-Mar-2013				A method of coating a substrate includes mixing an antimony precursor with a metal oxide precursor at a tempe between 30°C and 100°C, allowing the temperature of the mixture to decrease, and depositing the mixture over a portion of a substrate to form an antimony doped metal oxide coating layer. The antimony precursor is at less weight percent of the total weight of the precursor mixture.
08036598V1	SOLAR CONTROL COATING WITH DISCONTINUOUS METAL LAYER	US	61/618471	29-Mar-2012				An architectural transparency includes a substrate, a first dielectric layer formed over at least a portion of the su a continuous metallic layer formed over at least a portion of the first dielectric layer, a second dielectric layer for over at least a portion of the first metallic layer, and a subcritical metallic layer formed over at least a portion of t second dielectric layer such that the subcritical metallic layer forms discontinuous metallic regions.
10037080V1	UNDERCOATING AND SODIUM BARRIER LAYER	US	61/777285	12-Mar-2013				A solar cell includes a substrate and an undercoating formed over at least a portion of the substrate. The undercoating includes silica and titania and is essentially free of phosphorous oxide. A conductive coating is formed over at least a por tion of the undercoating, wherein the conductive coating includes oxides of one or more of Zn, Fe, Mn, Al, Ce, Sn, Sb, Ni, Zr, Si, Zn, Ti, Co, Cr, Si or In or an alloy of two or more of these materials.
10037089V1	SOLAR MIRROR HAVING REFLECTIVE COATINGS ON A FIRST SURFACE AND AN OPPOSITE SECOND SURFACE	US	61/319601	31-Mar-2010				
10037112V1	COATED GLASSES HAVING A LOW SHEET RESISTIVITY, A SMOOTH SURFACE, AND/OR A LOW THERMAL EMISSIVITY	US	61-564837	18-Jan-2012				A glass sheet of one embodiment of the invention has an electrically conductive film having a sheet resistivity in the range of 9.5 to 11.5 ohms/square; an emissivity in the range of 0.140 to 0.155 and an absorption coefficient of greater than 1.9 x10exp-1 in the wavelength range of 400-1100 nanometers, and a surface roughness of less than 15 nanometers Root Means Square. A glass sheet of another embodiment of the invention has an electrically conductive film having a phosphorous-fluorine doped tin oxide pyrolytically deposited film on the surface of the glass sheet, wherein the ratio of phosphorous to fluorine is in the range of greater than 0. The glass sheets can be used to make a multi sheet insulating unit, the unit having a spacer frame, a first glass sheet secured to a first outer surface of the spacer frame, a second glass sheet secured to opposite second surface of the spacer frame, a pyrolytically deposited fluorine doped tin oxide film over outer surface of the first sheet and a magnetron sputtered vacuum deposited low-e coating on at least an inner surface of one of the first and second sheets.
1009F3	CATHODE TARGETS OF SILICON AND TRANSITION METAL	US	08/828632	06-Mar-1997		5708938	20-Jan-1998	Silicon-chromium cathode targets comprising 5 to 80 weight percent chromium are disclosed for sputtering absorbing coatings of silicon-chromium alloy in atmospheres comprising inert gas, reactive gases such as nitrogen, oxygen, and mixtures thereof which may for her comprise inert gas, such as argon, to form nitrides, oxides, and oxynitrides as well as metallic films. The presence of chromium in the cathode target in the range of 5 to 80 weight percent provides target stability and enhanced sputtering rates over targets of silicon alone, comparable to the target stability and sputtering rates of silicon-nickel, not only when sputtering in oxygen to produce an oxide coating, but also when sputtering in inert gas, nitrogen or a mixture of nitrogen and oxygen to produce coatings of silicon-chromium, silicon-chromium nitride or silicon-chromium oxynitride respectively. The chromium in the target may be replaced in part with nickel, preferably in the range of 5 to 15 weight percent, to produce coatings of silicon-chromium-nickel and the oxides, nitrides and oxynitrides thereof.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
1017D1	LOW THERMAL CONDUCTING SPACER ASSEMBLY FOR AN INSULATING GLAZING UNIT AND METHOD OF MAKING SAME	US	08/412305	28-Mar-1995		5655282	12-Aug-1997	An insulating unit has a pair of glass sheets about an edge assembly to provide a compartment between the she The edge assembly has a U shaped spacer made of metal, metal coated plastic, gas and moisture impervious p or gas and moisture impervious foil coated polymer. The outer legs of the spacer and the glass provide a long d path to limit the diffusion of argon gas out of the compartment. The edge assembly has materials selected and s provide edge assembly having an RES-value of at least 75. A spacer for use in insulating units includes a plastic having a gas impervious film e.g. a metal film or a halogenated polymer film. Also taught herein are techniques f making the unit and spacer.
1017D1	METHOD OF MAKING AN INSULATING UNIT HAVING A LOW THERMAL CONDUCTING SPACER	US	09/760605	14-Feb-2000		6223481B1	01-May-2001	A method of fabricating an insulating unit includes the steps of: providing a pair of sheets and a substrate formed substrate into at least one spacer section having a base and a pair of outer legs connected to the base, the spac section having a surface designated as a supporting surface, providing a bead on the supporting surface, the bea provided on the supporting surface includes a moisture pervious adhesive having a desiccant therein and assem spacer frame that includes the at least one spacer section and the sheets provide an insulating unit having the p sheets in a fixed relationship.
1020P1	METHOD OF REDUCING GLASS SHEET MARKING	US	08/415810	03-Apr-1995		5707412	13-Jan-1998	
1021P1	BRONZE GLASS COMPOSITION	US	08/415792	03-Apr-1995		5565388	15-Oct-1996	The present invention provides a glass composition having a bronze color and a luminous (visible) transmittance of ..... or greater. The base glass is a soda-lime-silica composition and iron and selenium are added as colorants. In one preferred embodiment of the invention, a bronze colored glass with a luminous transmittance (C.I.E. illuminant A) of 70% and higher at a thickness of 4.1 millimeters may be attained by using as colorants: 0.4 to 0.6 wt.% Fe2O3, 0.09 to 0.17 wt.% FeO and 5 to 11 PPM Se. In addition, it is preferred that the total solar energy transmittance be no greater than 65%.
1033A1	SHEET SHAPING PRESS	US	08/449773	24-May-1995		5656055	12-Aug-1997	The present invention provides a ring mold for shaping heat-softenable sheet material. The mold includes peripheral wall members enclosing a central cavity having an open upper end. The wall members have an upper sheet shaping surface with a peripheral shape and elevational contour that generally corresponds to a desired peripheral shape and elevational contour of a sheet to be shaped. A first set of slots are positioned along and extend through portions of one of the wall members and a second set of slots are positioned along and extend through portions of an opposing wall member. Each of the slots in the second set is generally horizontally aligned with a corresponding slot in the first set.
1036D1	METHOD OF MAKING A GLAZING UNIT HAVING THREE OR MORE GLASS SHEETS AND HAVING A LOW THERMAL EDGE	US	08/449595	24-May-1995		5601677	11-Feb-1997	
1038D2	METHOD OF AND NOZZLE FOR FILLING COMPARTMENT OF A MULTI-SHEET GLAZING UNIT	US	08/449694	24-May-1995		5775399	07-Jul-1998	An injector for moving an insulating gas into the sealed air space of a multi-sheet insulating unit includes a tube e.g. inner tube mounted within an outer tube and spaced from the inner walls of the outer tube to provide an exhaust passage. The outer tube is mounted on the middle leg by a C-clamp. Insulating air is moved through the inner tube into the sealed air space to displace the gas therein which displaced gas moves through the exhaust passageway.
1041D1	A METHOD OF MAKING SPACER STOCK	US	08/451097	25-May-1995		5761946	09-Jun-1998	A flat corrugated substrate having a bead of a gas and/or moisture pervious adhesive having a desiccant is moved along a predetermined linear path between spaced upper wheels aligned with spaced lower wheels. The upper wheels have a peripheral groove to shape the bead as the substrate moves between the upper and lower wheels. The lower wheels each have a U shape peripheral groove with the base of the U of the downstream wheels being narrower than the base of the U of the upstream wheels and the depth of the U of the downstream wheels being deeper than the depth of the U of the upstream wheels to provide a spacer stock having a base connected to a pair of spaced upright legs such that the base connected to the legs have a generally U shape configuration and a shaped bead on the surface of the base between the legs. The spacer stock may be bent to form a spacer frame to separate outer sheets of an insulating glass unit.
1041D3	SPACER AND SPACER FRAME FOR AN INSULATING GLAZING UNIT AND METHOD OF MAKING SAME	US	09/396363	15-Sep-1999		6470636B1	29-Oct-2002	A substrate having a bead of a moisture and/or gas pervious adhesive having a desiccant therein is shaped to provide U shaped spacer stock. The spacer stock is bent to provide a spacer frame having continuous corners.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
1044C1	AUTOPHOBIC WATER REPELLENT SURFACE TREATMENT	US	08/734155	21-Oct-1996		5868864	16-Nov-1997	a composition and method are disclosed whereby a substrate such as glass, plastic, metal, inorganic polymer substrate or inorganic coated substrate is provided with a durable non-wetting surface by treatment with a perfluoroalkylalkyl silane in a solvent which together form a composition which initially wets the surface. As the perfluoroalkylalkyl silane reacts with the surface, the remaining composition is repelled by the perfluoroalkyl treated surface due to the difference between the surface tension of the solvent and the free energy of the treated surface, for expedient removal of the remaining composition from the treated surface.
1047C1	WATER REPELLENT SURFACE TREATMENT WITH INTEGRATED PRIMER	US	08/727698	29-Sep-1996		5674967	07-Oct-1997	A composition comprising perfluoroalkylalkylsilane and a completely hydrolyzable silane or siloxane is disclosed providing nonwetting properties to the surface of various substrates such as glass, plastic, metal, organic polymer coated substrates or inorganic coated substrates. The nonwetting property, as measured by contact angle of a water on the treated substrate surface, is more durable than the nonwetting property of a surface treated with perfluoroalkylalkylsilane with the hydrolyzable silane or siloxane.
1047P2	WATER REPELLENT SURFACE TREATMENT WITH ACID ACTIVATION	US	08/880952	07-Jun-1996		5707740	13-Jan-1998	The present invention relates to improving the durability of water repellent films and a method for providing the substrate. The water repellent film is preferably formed over the substrate by applying a water repellent composition over the substrate which will form the water repellent film. The durability of the water repellency of the film is improved by activating the substrate with an acid prior to forming the water repellent film over the substrate.
1048D1	A MIXED METAL OXIDE FILM HAVING AN ACCELERANT	US	09/678252	11-Jul-1996		6776238	07-Jul-1998	Silicon compounds useful as coating reactants for the chemical vapor deposition of silicon oxide are disclosed, along with compounds useful as accelerants to increase the deposition rate of silicon oxide. The silicon-containing precursor comprises the structural formula <IMAGE> wherein R1 is an alkyl, alkenyl, alkynyl or aryl radical which may be substituted, and R2 is a functional group which increases the reactivity of the silicon compound by withdrawing electron density away from the silicon atom, such as hydrogen, halogen, alkenyl, alkynyl, halogenated alkyl and perhalogenated alkyl radicals. The accelerant is a compound selected to take advantage of the partial positive charge on the silicon atom. Such accelerant compounds include Lewis acids and bases, water, ozone, trivalent compounds of nitrogen, boron and phosphorus; tetravalent compounds of sulfur and selenium; pentavalent compounds of phosphorus and a variety of metal compounds. Also disclosed are compositions including an additional metal-containing coating precursor, such as an organotin compound, to deposit and mix metal oxide along with silicon oxide.
1048D2	COMPOUNDS AND COMPOSITIONS FOR COATING GLASS WITH SILICON OXIDE	US	09/057677	09-Apr-1998		7897259	01-Mar-2011	Silicon compounds useful as coating reactants for the chemical vapor deposition of silicon oxide are disclosed, along with compounds useful as accelerants to increase the deposition rate of silicon oxide. The silicon-containing precursor comprises the structural formula <IMAGE> wherein R1 is an alkyl, alkenyl, alkynyl or aryl radical which may be substituted, and R2 is a functional group which increases the reactivity of the silicon compound by withdrawing electron density away from the silicon atom, such as hydrogen, halogen, alkenyl, alkynyl, halogenated alkyl and perhalogenated alkyl radicals. The accelerant is a compound selected to take advantage of the partial positive charge on the silicon atom. Such accelerant compounds include Lewis acids and bases; water; ozone; trivalent compounds of nitrogen, boron and phosphorus; tetravalent compounds of sulfur and selenium; pentavalent compounds of phosphorus and a variety of metal compounds. Also disclosed are compositions including an additional metal-containing coating precursor, such as an organotin compound, to deposit and mix metal oxide along with silicon oxide.
1049P1	APPARATUS FOR COATING A MOVING GLASS SUBSTRATE	US	09/464113	05-Jan-1995		5863327	26-Jan-1999	An apparatus for coating a moving substrate which provides means for directing a coating composition vapor toward a substrate surface and moving portions of the vapor in opposite directions. The apparatus of the present invention may have the exhaust means on either side of the vapor directing means spaced at different distances from the vapor directing means, or the exhaust means may be spaced equally from the vapor directing means, but at different distances from the substrate surface. In another embodiment, the apparatus comprises the means to alter the flow volume of the vapor directing means and the two exhaust means such that the flow volume of the first and second exhaust means are not equal, such as by the exhaust means having openings of unequal surface area, wherein the exhaust means may be spaced equally or unequally from the vapor directing means at the same or different distances from the substrate surface. In another embodiment, the apparatus further comprises a structural element bridging the space between the vapor directing means and the exhaust means, which may be spaced equally or unequally from the vapor directing means, and at the same or different distances from the substrate surface.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
1048P2	COMPOUNDS AND COMPOSITIONS FOR COATING GLASS WITH SILICON OXIDE	US	08/472589	07-Jun-1995		5599387	04-Feb-1997	Silicon compounds useful as coating reactants for the chemical vapor deposition of silicon oxide are disclosed, and with compounds useful as accelerants to increase the deposition rate of silicon oxide. The silicon-containing precursor comprises the structural formula <IMAGE> wherein R1 is an alkyl, alkenyl, alkynyl or aryl radical which may be substituted, and R2 is a functional group which increases the reactivity of the silicon compound by withdrawing electron density away from the silicon atom, such as hydrogen, halogen, alkenyl, alkynyl, halogenated alkyl and perhalogenated alkyl radicals. The accelerant is a compound selected to take advantage of the partial positive charge on the silicon atom. Such accelerant compounds include Lewis acids and bases, water, oxides of select compounds of nitrogen, and phosphorus; tetravalent compounds of sulfur and selenium, pentavalent compounds of phosphorus and a variety of metal compounds. Also disclosed are compositions including an additional metal-containing coating precursor, such as an organotin compound, to deposit also her metal oxide along with silicon oxide.
1053D1	A METHOD OF MAKING A TEMPERED COATED ARTICLE	US	08/471662	06-Jun-1995		5552180	03-Sep-1996	A temperable coated article with metallic properties is prepared by coating a glass substrate with a metal-containing layer such as titanium nitride, which ordinarily oxidizes at high temperature, overcoating with a protective layer of a silicon compound which forms a durable layer and prevents oxidation of the underlying metal-containing film and undercoat with a stabilizing metal-containing layer. The coated article can be tempered without losing its metallic properties to oxidation.
1061A1	METHOD OF FORMING A GLASS AND PLASTIC LAMINATE	US	08/491883	16-Jun-1995		5698053	16-Dec-1997	
1068A1	L-SHAPED HEATING ELEMENT WITH RADIUSED END FOR A WINDSHIELD	US	08/496132	27-Jun-1995		5653903	05-Aug-1997	The wiper rest area of an automotive windshield is heated by a heatable member optionally mounted on a polyester substrate or heating element. The windshield includes outer and inner glass sheets secured together by an interlayer. The heating element is positioned on inner surface of the outer glass sheet and held in position by the interlayer securing the inner and outer sheets together. The heating element or heatable member has extensions extending beyond the edge of the windshield to provide external electrical access to the heatable member to power the heating element to heat the wiper rest area or position
1074D1	DURABLE SPUTTERED METAL OXIDE COATING	US	09/508405	10-May-2001	6008621	6346774B1	12-Feb-2002	A method and resultant product are disclosed wherein a metal film is deposited by sputtering a metal or oxide target in an essentially nonreactive atmosphere comprising inert gas and a reactive gas, wherein the concentration of reactive gas is sufficiently low that the sputtering is accomplished in the metallic mode, i.e. the film is deposited as metal. The metal film of the present invention is harder than a metal film sputtered in an atmosphere consisting of only inert gas. The method and resultant product may further comprise thermal oxidation of the metal film, which proceeds more efficiently than oxidation of a metal film sputtered in an atmosphere consisting of only inert gas.
1074D2	DURABLE SPUTTERED METAL OXIDE COATING	US	10/077921	12-Feb-2002	0127436-A1			A method and resultant product are disclosed wherein a metal film is deposited by sputtering a metal oxide target in an essentially nonreactive atmosphere comprising inert gas and a reactive gas, wherein the concentration of reactive gas is sufficiently low that the sputtering is accomplished in the metallic mode, i.e. the film is deposited as metal. The metal film of the present invention is harder than a metal film sputtered in an atmosphere consisting of only inert gas. The method and resultant product may further comprise thermal oxidation of the metal film, which proceeds more efficiently than oxidation of a metal film sputtered in an atmosphere consisting of only inert gas.
1076A1	DEVICE FOR AND METHOD OF ALIGNING AND/OR MAINTAINING A SIDE OF A SPACER FRAME IN ALIGNMENT DURING FABRICATION OF A	US	08/518315	23-Aug-1995		5720836	24-Feb-1998	
1079A1	ON-GLASS ANTENNA AND CONNECTOR ARRANGEMENT	US	08/527593	13-Sep-1995		5748156	05-May-1998	

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
1061A1	METHOD AND COMPOSITION FOR APPLYING ACIDIC INTERLEAVING MATERIAL IN AQUEOUS MEDIA TO GLASS SHEETS	US	08/529,690	15-Sep-1995		5695676	09-Dec-1997	A method and composition are disclosed for applying an organic acid-containing aqueous composition to a g surface to prevent staining thereof wherein a wetting agent is employed to provide uniform and complete wet glass surface with a uniform continuous film of said organic acid-containing aqueous composition.
1082A1	BUFFERED ACID INTERLEAVING FOR GLASS SHEETS	US	08/528,833	18-Sep-1995		5641575	24-Jun-1997	An organic acid anti-staining composition for glass sheets is disclosed herein whereby the corrosive effects o pH are eliminated by buffering the organic acid. The buffered organic acid has a less acidic pH, but is as effe unbuffered organic acid in neutralizing alkali formed by sodium from the glass to prevent staining of the glass
1083P1	SPACER FOR AN INSULATING UNIT HAVING IMPROVED RESISTANCE TO TORSIONAL TWIST	US	08/529,180	18-Sep-1995		5617699	08-Apr-1997	A spacer stock and/or spacer frame having a pair of spaced outer legs joined by a base has a strengthening integral with the base or an insert between the legs to reduce the degree of torsional twist of the spacer stock spacer frame. In one embodiment during the forming of the spacer stock a "T" shaped member is formed on the base to reduce the degree of torsional twist.
1084P1	GRAY GLASS COMPOSITION	US	08/529,099	15-Sep-1995		6274528B1	14-Aug-2001	
1092A1	GLASS SHIPPING RACK HAVING REMOVABLE FRONT AND/OR REAR GATES	US	08/540,615	27-Oct-1995		5711429	27-Jan-1998	A rack has a front wall and back wall connected to a base to secure glass sheets in the rack on edge tilted to back wall. The front restraints are mounted on the front gate and sheet support members mounted on the rea secure the sheets in position on the rack. The front gate and/or rear gate each have a pair of spaced posts w he posts having an end insertable in cavities provided on the base. Each of the insertion ends of the posts has a hole in one surface and an opposite sloping surface. The front gate and back gate are mounted on the base by positioning the insertion end on the edge of the cavity and tilting the gates to the vertical position to drop the insertion end of the posts in the cavities. A pin in each of the cavities passes into the hole at the insertion end of the posts to secure the gates on he base. The front restraints and sheet support members include an elongated tube having a plurality of collars rotatably mounted thereon.
1092D1	GLASS SHIPPING RACK HAVING REMOVABLE FRONT AND/OR REAR GATES	US	08/931,781	16-Sep-1997		5860539	19-Jan-1999	A rack has a front wall and back wall connected to a base to secure glass sheets in the rack on edge tilted toward the back wall. The front restraints are mounted on the front gate and sheet support members mounted on the rear gate to secure the sheets in position on the rack. The front gate and/or rear gate each have a pair of spaced posts with each of he posts having an end insertable in cavities provided on the base. Each of the insertion ends of the posts has a hole in one surface and an opposite sloping surface. The front gate and back gate are mounted on the base by positioning the insertion end on the edge of the cavity and tilting the gates to the vertical position to drop the insertion end of the posts in the cavities. A pin in each of the cavities passes into the hole at the insertion end of the posts to secure the gates on he base. The front restraints and sheet support members include an elongated tube having a plurality of collars rotatably mounted thereon.
1098A1	ELECTRICALLY ACTIVATED FLEXIBLE PRESS FOR SHAPING HEAT SOFTENABLE SHEET MATERIAL	US	08/569,637	11-Dec-1995		5849056	15-Dec-1998	The present invention provides a shaping mold for shaping heat softenable sheet material which includes a flexible rail having a sheet shaping surface to support a marginal edge portion of a sheet to be shaped and a plurality of controllable actuators secured to the rail and capable of deforming the rail to provide its surface with configurations each having a desired elevational contour. In one particular embodiment of the invention, the shaping rail is a shaping ring having a peripheral configuration which provides generally continuous support about the marginal edge portion of said sheet. A controller is used to control each actuator and deform the sheet shaping surface of the ring from a first configuration having a generally flat elevational contour to a second configuration having an elevational contour that generally corresponds to the final desired contour of the marginal edge portion of the sheet.
1102A1	REBIET MATERIAL FOR DELETION OF COATINGS	US	08/574,594	18-Dec-1995		5713968	03-Feb-1998	
1119A1	REDUCTION OF HAZE IN TRANSPARENT COATINGS	US	08/592,795	04-Jan-1996		5744215	28-Apr-1998	

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
1124P1	ALKALI METAL DIFFUSION BARRIER LAYER	US	08/597543	01-Feb-1996		5830252	03-Nov-1998	Amorphous metal oxide barrier layers of titanium oxide, zirconium oxide and zinc/tin oxide are effective as alkali ion barrier layers at thicknesses below 150 Angstroms. The amorphous metal oxide barrier layers are most effective when the density of the layer is equal to or greater than 90% of the crystalline density. The barrier layers prevent migration of alkali metal ions such as sodium ions from glass substrates into a medium e.g. electrolyte of a photochromic cell, liquid material of a liquid crystal display device contacting the glass surface. The properties of a medium, particularly electroconductive metal oxide coatings, are susceptible to deterioration by the presence of sodium ions migrating from the glass. One technique to obtain the desired density of the barrier layers is to provide substrates upstream and downstream of the cathode to limit the deposit of sputtered material to sputtered material travelling in a path generally normal to the surface being coated.
1124P2	ALKALI METAL DIFFUSION BARRIER LAYER	US	09/158730	17-Sep-1998		6327795B1	08-Mar-2002	Amorphous metal oxide barrier layers of titanium oxide, zirconium oxide and zinc/tin oxide are effective as alkali ion barrier layers at thicknesses below 150 Angstroms. The amorphous metal oxide barrier layers are most effective when the density of the layer is equal to or greater than 75% of the crystalline density. The barrier layers prevent migration of alkali metal ions such as sodium ions from glass substrates into a medium e.g. electrolyte of a photochromic cell, liquid material of a liquid crystal display device contacting the glass surface and a photocatalytic coating. The properties of the medium, particularly electroconductive metal oxide coatings, are susceptible to deterioration by the presence of sodium ions migrating from the glass.
1135P1	METHOD AND APPRATUS OF BENDING GLASS SHEETS	US	08/606617	26-Feb-1996		5858047	12-Jan-1999	An apparatus for shaping heat softened glass sheets includes a shaping station to receive a heat softened glass sheet to be shaped, first and second transfer stations positioned along opposing sides of the shaping station, and first and second cooling stations positioned adjacent a corresponding transfer station. An upper vacuum mold having first and second downwardly facing, shaped sheet engaging surfaces moves between the transfer stations and within the shaping station. The sheet engaging surfaces of the vacuum mold each have a shaped configuration generally corresponding to a final desired shape of a glass sheet to be shaped. Heat softened glass sheets are positioned within the shaping station and moved into engagement with one of the sheet engaging surfaces to shape the sheet. Vacuum is drawn along the sheet engaging surface to hold the shaped sheet thereagainst. The mold then moves the shaped sheet and engaging surface to one of the transfer stations where the vacuum is discontinued to deposit the shaped sheet on a sheet support. The sheet support then transfers the shaped sheet to one of the cooling stations, where the shaped sheet is controllably cooled.
1144P1	INFRARED AND ULTRAVIOLET RADIATION ABSORBING GREEN GLASS COMPOSITION	US	08/800063	12-Feb-1997		5830812	03-Nov-1998	The present invention provides a green colored glass using a standard soda-lime-silica glass base composition and additionally iron, cerium, chromium and, optionally, titanium as infrared and ultraviolet radiation absorbing materials and colorants. It is preferred that the glass have a green color characterized by a dominant wavelength in the range of about 500 to 565 nanometers with an excitation purity of no higher than about 5% and include about 0.50 to 1.0 wt. % total iron, about 0.25 to 0.65 wt. % FeO(S), about 0.05 to 3 wt. % CeO2, 0 to about 2 wt. % TiO2, and about 20 to 650 PPM CrO3. The redox ratio for the glass is maintained between about 0.20 to 0.55. The glass compositions disclosed in the present invention have an LTA of at least about 65%, preferably at least 70%, a TSUV of no greater than 38%, preferably no greater than 35%, a TSIR of no greater than about 35%, preferably no greater than about 30%, and a TSET of no greater than about 50%, preferably no greater than about 48%. In addition, the glass preferably has an ISO UV of no greater than about 15%, preferably no greater than about 10%.
1149A1	COATED ARTICLES	US	08/807352	27-Feb-1997		5821001	13-Oct-1998	Multilayer high transmittance, low emissivity low sign on transparent substrates feature a special anti-reflective base film of at least two parts on the substrate-near side of a metallic, reflective film. A first of the two parts is in contact with the metallic film. This first film-part has crystalline properties for causing the metallic film to deposit in a low resistivity configuration. The second of the two film-parts supports the first part and is preferably amorphous. Coated articles of the invention also feature, in combination with the above-mentioned base film or independently thereof, a newly discovered, particularly advantageous subrange of thicker primer films for coated glass that can be thermally processed for tempering, heat strengthening, or bending.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
1159A1	INFRARED AND ULTRAVIOLET RADIATION ABSORBING BLUE GLASS COMPOSITION	US	08/668942	17-Jun-1996		5688727	18-Nov-1997	The present invention provides a blue colored glass using a standard soda-lime-silica glass base composition an additionally iron and cobalt as solar radiation absorbing materials and colorants. In particular, the blue colored gl includes about 0.55 to 1.1 wt. % total iron, preferably about 0.6 to 0.85 wt. % and about 5 to 40 PPM CoO, prefer about 15 to 30 PPM and a luminous transmittance of at least 65%. If desired, the composition may include up to 100 PPM Cr2O3. The redox ratio for the glass of the present invention is maintained between about 0.25 to 0.35, preferably between about 0.28 to 0.33. The glass color is characterized by a dominant wavelength (DW) of about 491 nanometers and an excite ion purity (Pe) of about 3 to 18 percent. In one particular embodiment of the inven the color of the glass is characterized by a dominant wavelength in the range of about 487 to 489 nanometers an excite ion purity of about 3 to 8 percent at a thickness of about 0.084 to 0.126 inches, an excitation purity of abou 12 percent at a thickness of about 0.126 to 0.189 inches, and an excitation purity of about 10 to 18 percent at a thickness of about 0.189 to 0.315 inches.
1183D1	PRESSURE FORMING OF GLASS SHEETS	US	08/711489	10-Sep-1996		5792919	23-Jun-1998	The present invention discloses a method and apparatus for shaping glass sheets to deeply sagged configuratio using a lower outline mold and an upper shaping mold while minimizing marking of the sheets by shaping molds. outline mold includes a support rail which generally corresponds to the desired curvature of a peripheral portion sheets to be shaped and supports the glass sheets as they are heated and sagged by gravity to a preliminary sh The outline mold and the upper mold are then moved relative to each other to position the molds either in close proximity to each other or to press the upper mold against the glass sheets. Pressurized gas is then directed thro mold to at least the unsupported central portions of the preliminarily shaped sheets, to urge these unsupported p downward and shape the sheets to a desired configuration.
1192A1	METHOD FOR SEALING AN ELECTRICAL CONNECTION TO A LAMINATED TRANSPARENCY	US	08/713915	13-Sep-1996		5902536	11-May-1999	The present method includes an apparatus for filling and sealing an opening in a laminate and in particular sealing the cut out notch area of a vehicle windshield. A mold fixture includes a mold, a backing plate, a sealant inlet and a vent. The mold has resilient sealant contacting surfaces that provide a smooth surface for forming the surface of the sealant filling the opening. The mold fixture is clamped to the laminate such that selected portions of the mold overlay the opening and remaining portions of the mold overlay selected portions of the laminate immediately adjacent the opening. Sealant is injected into a cavity formed by the laminate and the mold fixture to seal the opening. The sealant is allowed to cure to achieve a desired hardness and the mold fixture is then removed from the laminate.
1193D1	ULTRAVIOLET ABSORBING GREEN TINTED GLASS	US	08/742438	30-Oct-1996		6583383B1	22-Apr-2003	The present invention provides a green tinted, ultraviolet absorbing, soda lime silica glass having a luminous transmittance of at least 70 percent and ultraviolet transmittance of no more than 38 percent at thickness ranging from 0.154 to 0.188 inches (3.9 to 4.9 mm). These properties are achieved in the present invention by using a colorant portion that is either (a) greater than 0.6 percent by weight total iron (expressed as Fe2O3) with a redox (FeO/total iron) of from 0.275 to less than 0.35 or (b) from greater than 0.6 to 0.85 percent by weight total iron with a redox of less than 0.35. It is preferred that the glass have a dominant wavelength of 495 to 535 nanometers.
1937P1	METHOD OF MAKING COATED ARTICLES AND COATED ARTICLES MADE THEREBY	US	10/139805	25-Apr-2002	0172775			A method of making a coated substrate includes providing a substrate having at least one functional coating with a first emissivity value; depositing at least one coating material having a second emissivity value over at least a portion of the at least one functional coating wherein the deposited coating has a thickness ranging from greater than 100 Å to less than 10 microns and a refractive index ranging from 1.4 to 2. The resulting coating stack has an emissivity value greater than the emissivity value of the functional coating. Optionally the coated substrate is heated whereby the coated substrate can be bent to a desired shape and/or tempered.
1940A1	SUBSTRATES COATED WITH MIXTURES OF TITANIUM AND ALUMINUM MATERIALS, METHODS FOR MAKING THE SUBSTRATES, AND CATHODE TARGETS OF TITANIUM AND ALUMINUM METAL	US	10/699770	05-Nov-2003	4/241490A1			Titanium and aluminum cathode targets are disclosed for sputtering absorbing coatings of titanium and aluminum-containing materials in atmospheres comprising inert gas, reactive gases such as nitrogen, oxygen, and mixtures thereof, which can for her comprise inert gas, such as argon, to form nitrides, oxides, and oxynitrides, as well as metallic films. The titanium and aluminum-containing cathodes may be used as an outer coat or as one or more coating layers of a coating stack.

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1859A1	APPLIANCE WITH COATED TRANSPARENCY	US	10/850845	21-May-2004	0259471			An appliance transparency, such as an oven transparency, includes at least one substrate and a coating deposit at least a portion of the substrate. The coating includes at least one metal layer, such as a metallic silver layer. T metal layer can have a thickness in the range of 80 Å to 100 Å and optionally or the coating can have a protective coating associated therewith.
1860A1	SOLAR CONTROL COATING WITH METAL ALLOY FILM	US	10/460740	17-Jun-2003	4/0258828A1			A solar control coating for applying to a substrate and having an infrared reflective layer sandwiched between a p transparent inside ing layers, such as dielectric layers. The infrared reflective layer includes an alloy of a reflective where the alloying element oxidizes preferentially over the reflective metal.
1910A1	HIGH PERFORMANCE BLUE GLASS	US	10/767914	29-Jan-2004	5/17094461			A glass composition for forming a blue colored glass is disclosed. The glass composition is made up of a base g por ion, iron oxide, and at least one first addi ive compound selected from Nd2O3 in an amount up to 1 weight pe erbium OxO in an amount up to 0.5 weight percent. The base glass por ion has the following components: SiO2 to 78 weight percent, NaCO from 10 to 20 weight percent: CaO from 5 to 15 weight percent, MgO from 0 to 5 wei percent: Al2O3 from 0 to 5 weight percent: B2O3 from 0 to 5 weight percent, and K2O from 0 to 5 weight percent total iron in the glass composition ranges from 0.8 to 1.2 weight percent, and the glass composition has a redox ranging from 0.15 to 0.65.
1933A1	HYBRID COATING STACK	US	10/832600	27-Apr-2004	5/2389/3A1			A coating includes a functional coating, such as a solar control coating having at least one metal layer. A topcoat formed over at least a portion of the functional coating. The topcoat includes a first topcoat layer having a thickn ss in range of 0.5 QWOT to 1.5 QWOT w h respect to a reference wavelength of 550 nm and a first refractive index, and a second topcoat layer having a thickness in the range of 0.5 QWOT to 1.5 QWOT with respect to a reference wavelength of 550nm and a second refractive index different from the first refractive index.
1950A1	COATED SUBSTRATE WITH IMPROVED SOLAR CONTROL PROPERTIES	US	10/812715	05-Aug-2004	5/0287/46/			A coated substra e is disclosed. The coated substrate includes a substr ate and a first dielectric layer overlying the substra e having a total thickness greater than 290 Å, a first infrared-reflective metal layer having a thickness ranging from 100 Å to 190 Å overlying the first dielectric layer; a first primer layer having a thickness ranging from 0.5 Å to 60 Å overlying the first infrared-reflective metal layer; a second dielectric layer overlying the first primer layer having a total thickness ranging from 560 Å to 670 Å; a second infrared-reflective metal layer having a thickness ranging from 115 Å to 150 Å overlying the second dielectric layer; a second primer layer having a thickness ranging from 0.5 Å to 60 Å overlying the second dielectric layer; and a third dielectric layer having a total thickness ranging from 190 Å to 310 Å overlying the second metal layer.
1971A1	METAL BASED COATING COMPOSITION AND RELATED COATED SUBSTRATES	US	10/891748	01-Sep-2004	8/04/0/8A1			A coated substrate is disclosed. The coated substrate includes a substrate and a coating composition over the substrate comprising at least one metal based layer selected from tungsten, chromium, rhenium, molybdenum, ruthenium, niobium, and mixtures and alloys thereof, and mixtures and alloys of cobalt and chromium; and at least one dielectric layer including SixNy,where x/y ranges from 0.75 to 1.5, over the metal based layer. The ?Esmr (1.5:1) (T), ?Esmr (1.5:1) (R1) and ?Esmr (1.5:1) (R2) of a non-heat treated, coated substrate as compared to a heat treated, coated substrate according to the present invention are no greater than 8 units.
8237V1	SOLAR CONTROL COATING	US	61/176934	08-May-2009				
8739	ELECTRICALLY HEATABLE TRANSPARENCY	US	07/280225	27-Dec-1988		5414240	09-May-1995	An electrically heatable windshield with a hidden bus bar configuration. A border of opaque ceramic material, preferably a lead borosilicate enamel, is bonded to an interior surface of the transparency about its periphery. Opposing electroconductive bus bars, preferably a low fri content silver-containing ceramic material, are bonded to the ceramic material so that the entire inner edge of the bus bar overlays a portion of the ceramic material and is spaced from the inner edge of the border, providing an intermediate portion of the border between the bus bars and transparency surface that is not covered by the bus bars. An electro-conductive coating is applied to the transparency to interconnect the bus bars and covers to the inner surface of the transparency, the bus bars and the intermediate portion of the ceramic material border so that electric current flowing between the bus bars must flow through the portion of the coating that covers the intermediate portion of the border.
8934	CENTER BIASED STIRRING FOR IMPROVED GLASS HOMOGENIZATION	US	07/484311	06-Feb-1990		5006145	09-Apr-1991	Better homogenization of molten glass or the like is achieved by a row of stirrers when greater stirring force is provided in the center portion of the row. Preferred embodiments employ stirrers with blades, and stirrers in the center portion have longer blades than in outboard portions of the row.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
8979	MELTING GLASS WITH OXIDATION CONTROL AND LOWERED EMISSIONS	US	07/543905	25-Jun-1990		5006144	09-Apr-1991	Premature dissociation of fining agent is avoided in a glass melting operation while controlling the final redox product glass by initiating the melting process under relatively reducing conditions and subsequently altering conditions to make the glass more reducing. A glass that is more reduced than usual can thereby be produced exhibiting the ability to adequately fine the glass. For a given redox level, less fining agent need be used, thereby lowering emissions from the melting operation, because dissociation of the fining agent is delayed until a later the process where the redox conditions are changed.
8982	HIGHLY TRANSPARENT, EDGE COLORED GLASS	US	07/545722	29-Jun-1990		5030594	09-Jul-1991	A clear glass, with the substantial absence of color in transmittance, and with an attractive, bright, pure edge color is achieved in a glass having greater than 87 percent, preferably greater than 89 percent, luminous transmittance by using very small amounts of iron oxide as the sole essential colorant, with the ra io of iron in state to total iron being at least 0.4.
8983	LIGHTLY TINTED GLASS COMPATIBLE WITH WOOD TONES	US	07/545723	29-Jun-1990		5030595	09-Jul-1991	
9003	ULTRAVIOLET ABSORBING, GREEN TINTED GLASS	US	07/558915	30-Jul-1990		5240886	31-Aug-1993	A green tinted, ultraviolet absorbing glass is obtained by the addition of colorant to a standard soda-lime-silica glass composition and a colorant includes less than 0.6 weight percent of cerium oxide (CeO2), greater than 0 percent of total iron expressed as Fe2O3 and a ratio of ferric iron expressed as FeO to total iron of less than 0 glass has a low ultraviolet transmittance, viz., no greater than 37 percent over the wavelength range of 300 to nanometers at a reference glass thickness of 3.9 millimeters. An advantage of the glass of this invention over competing ultraviolet absorbing glass is the use of larger amounts of total iron and smaller proportions of iron in the ferrous state to obtain the low ultraviolet transmittance. In this manner, the amounts of cerium oxide which is expensive is reduced.
9016	SPACER AND SPACER FRAME FOR AN INSULATING GLAZING UNIT AND METHOD OF MAKING SAME	US	07/576887	04-Sep-1990		5177916	12-Jan-1993	An insulating unit is disclosed having a pair of glass sheets about an edge assembly to provide a compartment between he sheets. The edge assembly has a U-shaped spacer made of metal, metal coated plastic, gas and moisture impervious polymer, or gas and moisture impervious film coated polymer. The outer legs of the spacer and the glass provide a long diffusion path to limit the diffusion of argon gas out of the compartment. The edge assembly has materials selected and sized to provide edge assembly having an RES-value of at least 75. Also disclosed is a spacer for use in insulating units including a plastic core having a gas impervious film e.g. a metal foil or a homogenated polymer film. Also taught herein are techniques for making the unit and spacer. The unit has a long diffusion path to increase the time period in which insulating glass e.g. Argon gas may be retained in the compartment. The increased RES-value provides a unit that has a low thermal conductivity edge, in this manner heat loss through the marginal edge of the unit is reduced.
9028	METHOD AND APPARATUS FOR GLASS EDGE FINISHING	US	07/590705	01-Oct-1990		5041151	20-Aug-1991	
9037	SILICA-FREE UV-ABSORBING ABRASION RESISTANT COATINGS	US	07/591621	02-Oct-1990		5385964	31-Jan-1995	A silica-free, abrasion resistant and ultraviolet radiation resistant coating is disclosed comprising an organic UV absorbing component such as hydroxybenzophenone in an inorganic oxide matrix formed by the hydrolysis and condensation of an organic alkoxysilane and a silicon ether metal alkoxide.
9034	BUS BAR JUMPER FOR HEATABLE WINDSHIELD	US	07/591817	02-Oct-1990		5092687	18-Feb-1992	A dual lead electrically heatable windshield is provided with an internal jumper arrangement that allows the bus bar having the dual lead to be powered by a single external connection to one of the dual leads. A jumper arrangement may also be used in combination with a crack detector for the dual lead heatable windshield.
9049	ELECTRICAL CONNECTORS FOR ELECTRICALLY HEATED VEHICLE WINDOWS	US	07/607947	01-Nov-1990		5209444	04-May-1993	
9066	SOLID-STATE ELECTROCHROMIC DEVICE WITH PROTON-CONDUCTING POLYMER ELECTROLYTE AND PRUSSIAN BLUE COUNTERELECTRODE	US	07/633095	26-Dec-1990		5216621	01-Jun-1993	
9069	TRANSPARENT COUNTERELECTRODES	US	07/633094	26-Dec-1990		5099360	11-May-1992	

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9071	METHOD OF USING AMORPHOUS PRECIPITATED SILICA PARTING MATERIAL FOR SHAPING GLASS SHEET DOUBLETS	US	07/639013	28-Dec-1990		5110336	05-May-1992	The number of faint laminated glass windshields having bull's eyes that adversely affect its optical prope by using amorphous precipitated silica particles such as is used as flat ing agents for paints, as a par ing between a pair of glass sheets during bending. The particles form relatively soft agglomerates that are m classified to produce a narrow distribution of particle sizes as compared to the distribution found in unitre as diatomaceous earths previously used as a parting material.
9100	REFLECTIVE PATTERNED GLASS PRODUCT AND COATING METHOD	US	07/677948	01-Apr-1991		5419958	23-May-1995	A patterned light and heat reflective product comprising a substrate with a discontinuous pattern of light r reflective coating is disclosed, along with a method for its production, comprising the steps of applying a material to a substrate surface, depositing a continuous light and heat reflective coating over the resist p removing the resist material and thereby also removing the portion of light and heat reflective material ov resist material to produce a light and heat reflective coating in a pattern complementary to the pattern of
9101	METHOD FOR FABRICATING AN ELECTRICALLY HEATABLE TRANSPARENCY	US	07/676619	28-Mar-1991		5270517	14-Dec-1993	
9178	HEAT PROCESSABLE METALLIC VACUUM COATINGS	US	07/768781	30-Sep-1991		5705278	06-Jan-1998	A heat processable metallic appearing coated article is prepared by coating a glass substrate with a met film such as chromium or titanium nitride, which ordinarily could be of high temperature, and overcoating ..... protective layer of a different metal which forms a dense oxide surface layer. The coated article is subjected to high temperature processing such as bending without losing its metallic appearance to oxidation.
9196	DURABLE WATER REPELLENT GLASS SURFACE	US	07/799807	29-Nov-1991		5328768	12-Jul-1994	A method and article are disclosed wherein a glass substrate is provided with a more durable non-wet ing surface. High water repellency and high lubricity are provided by perfluoroalkylsilanes which bond directly to a silica surface, preferably by treatment with a perfluoroalkylsilane and a fluorinated olefin telomer on a glass surface on which has been deposited a silica primer layer in accordance with the present invention. The durability of the water and dirt repellency of a glass surface is improved by applying a silica primer layer to the glass substrate prior to treating the surface with select fluorinated compounds. The silica primer layer may be applied to the glass surface by pyrolytic deposition, magnetron sputtering, sol-gel condensation reaction of e.g. alkyl silicates or chlorosilanes or other conventional methods. The silica primer of the present invention provides more durability to a glass surface treated with perfluoroalkylsilanes for high water repellency and high lubricity.
9196D1	MULTILAYER HEAT PROCESSABLE VACUUM COATINGS WITH METALLIC PROPERTIES AND METHOD OF HEAT PROCESSING	US	09/876,394	07-Jun-2001	60/44039	6623792B2	23-Sep-2003	A heat processable coated article suitable for tempering and/or bending which has metallic properties is prepared by coating a glass substrate. The substrate has deposited over it a stabilizing film and a metal-containing film is deposited over the stabilizing film. Also an overcoating with a protective layer of a silicon compound is deposited over the metal-containing film and forms a durable layer and prevents oxidation of the underlying metal-containing film. The coated article can be tempered and/or bent without losing its metallic properties to oxidation.
9207	ELECTRICALLY HEATED WINDOW	US	07/809113	16-Dec-1991		5162431	28-Jan-1993	
9238	ULTRAVIOLET ABSORBING GREEN TINTED GLASS	US	07/857803	26-Mar-1992		5385872	31-Jan-1995	A green tinted, ultraviolet absorbing glass is disclosed having a standard soda-lime-silica base glass composition and a colorant portion consisting essentially of on a weight basis: less than 2.0% total CeO sub 2, V sub 2 O sub 5, TiO sub 2 or MnO sub 2 and greater than 0.7% total iron (expressed as Fe sub 2 O sub 3) with the ratio of FeO/total iron less than 0.35. The glass achieves the amount of cerium required to yield low ultraviolet transmittance, viz., no greater than 31 percent (300 to 390 nanometers) at a reference thickness of 3.9 millimeters.
9238	HEATABLE WINDSHIELD	US	07/857144	25-Mar-1992		5213828	25-May-1993	The electrical connections for an electrically heatable windshield are sealed prior to the laminating operation to prevent gas from entering the interior of the windshield through the bus bar leads when the windshield is subjected to the elevated temperatures and pressures of the laminating process.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
9258	METHOD AND APPARATUS FOR BENDING GLASS SHEETS	US	07/906150	03-Jun-1992		5286271	15-Feb-1994	Glass sheets are heated to their heat softening temperature and conveyed to a shaping station having an uppe vacuum mold with a downwardly facing shaping surface corresponding to the desired shape of the glass sheet. T glass sheet is lifted into engagement with the shaping surface and held thereagainst by vacuum. The mold and t glass sheet are then moved to a transfer sta ion and the vacuum is released to deposit the shaped glass sheet o contoured conveying surface which generally conforms to the shaped glass sheet. The glass sheet is deposited contoured conveying surface as it is moving from the shaping station to the transfer station to impart movement glass sheet along the contoured conveying surface and minimize marring of the glass sheet as it contacts the co conveying surface.
9260	SPACER AND SPACER FRAME FOR AN INSULATING GLAZING UNIT AND METHOD OF MAKING SAME	US	07/906245	30-Jun-1992		5255481	26-Oct-1993	A substrate having a bead of a moisture and/or gas pervious adhesive having a desiccant therein is shaped to p shaped spacer stock. The spacer stock is bent to provide a spacer frame having continuous corners.
9276	LIGHTWEIGHT VACUUM SHUTTLE	US	07/939825	02-Sep-1992		5259859	09-Nov-1993	
9302	ULTRAVIOLET ABSORBING GREEN TINTED GLASS	US	07/976062	13-Nov-1992		5593929	14-Jan-1997	A green tinted, ultraviolet absorbing glass is disclosed having a standard soda-lime-silica base glass compositio colorant portion consisting essentially of on a weight basis: less than 2.0% TiO2 and greater than 0.6% total iron (expressed as Fe2O3) with the ratio of FeO/total iron less than 0.35. The glass exhibits an ultraviolet transmittan greater than 38 percent (300 to 400 nanometers) and a luminous transmittance (illuminant A) of at least 70 perc thicknesses ranging from 0.154 to 0.189 inches.
9341	COATING APPARATUS, METHOD OF COATING GLASS, COMPOUNDS AND COMPOSITIONS FOR COATING GLASS AND COATED GLASS SUBSTRATES	US	08/017930	16-Feb-1993		5356718	18-Oct-1994	An apparatus for coating a glass ribbon has an exhaust on each side of a coating unit at different distances therefrom. With this arrangement, por ions of the ribbon upstream and downstream of the coating unit are exposed to coating vapors from the coating unit for different periods of time. A coating mixture includes tin containing precursors and a silicon containing precursor. The silicon containing precursor has the structural formula (see formula I) where R1 is a group which does not have an oxygen available to form a peroxide, R2 is a functional group giving the silicon containing precursor the ability to be easily converted to silicon oxide coating, R3 is a bridging group to provide for multiple silicon atoms and R4 completes the bonding on the foundat ion silicon atom. An accelerant e.g. a phosphorous containing precursor may be used wi h the metal containing precursors to increase the deposition rate of the coating. The coating deposited on the glass has regions of continuously varying weight percent of silicon oxide and tin oxide as the distance from the glass-coat ing interface increases, with the surface of he coating farthest from the glass-coating interface being predominantly tin oxide. The regions within the coating provide the coating with different indices of refraction to eliminate iridescence resul ing from increased thickness of the in oxide at the outer coating surface and to provide the coated glass article wi h a neutral color. When phosphorous is used as the accelerant, the percent of crystallinity is reduced and approaches 0, thereby reducing or elimina ing the coating haze.
9353	SELENIUM ENCAPSULATION FOR PRODUCING COLORED GLASS	US	08/038304	29-Mar-1993		5385593	31-Jan-1995	The present invention provides a glass forming composition for encapsulating selenium which includes, by weight percent of raw materials, 20 to 50% silica and 50 to 80% alkali and alkaline earth materials. The composition has a liquidus temperature between 800 deg. to 1200 deg. C., preferably up to 1000 deg. C., and a viscosity up to 10,000 Poise at said liquidus temperature, preferably up to 5,000 Poise. The alkali and alkaline materials preferably include at least one group of materials combined in an approximate eutectic molar ratio. In one particular embodiment of he invention, the alkali and alkaline earth materials include groups of nitrates, such as KNO(3), NaNO(3) and/or Ca(NO(3))(2), and/or carbonates, such as K(2)CO(3), Na(2)CO(3) and/or Li(2)CO(3).
9355	RESTRAINT SYSTEM FOR A SHEET SHIPPING RACK	US	08/038717	29-Mar-1993		5379904	10-Jan-1995	A sheet restraint for a sheet shipping rack includes a first elongated tube rotatably mounted on a second elongated tube. The second tube has U-shaped member secured to each end to capture the first tube on the second tube while allowing he first member to rotate relative to the second member. A resilient elongated sheet engaging member is secured to he first member. A pair of spaced pins are mounted on he first member and engageable wi h the U-shaped member to limit rotation of the first member about the second member so that the rotational path of the sheet engaging member and first tube is limited. The engaging members on the second tube are slideable mounted to spaced standards at the front of a rack. In this manner the front restraint moves toward the base into engagement with the outermost sheet of a stack of sheets on the rack to maintain the sheets as an integral pack. During shipment, the movement of the sheets and rack by the transportation forces and any space resulting from such movement is taken up by the front restraints as it moves downwardly toward the base.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
9386	CATHODE TARGETS OF SILICON AND TRANSITION METAL	US	08/041915	31-Mar-1993		5417827	23-May-1995	Silicon-nickel cathode targets containing 0 to 15 weight percent nickel are disclosed for sputtering low absorbing coatings of silicon-nickel alloy in atmospheres containing reactive gases such as nitrogen, oxygen and mixtures which may further comprise inert gas such as argon to form nitrides, oxides, and oxynitrides as well as metallic t The presence of nickel in the cathode target in the range of 3 to 15 weight percent provides target stability and enhanced sputtering rates over targets of silicon alone or alloyed with aluminum, while maintaining a low coating refractive index and low absorbance, not only when sputtering in oxygen to produce an oxide coating, but also w sputtering in nitrogen or a mixture of nitrogen and oxygen to produce coatings of silicon-nickel nitride or oxynitric compounds.
9560	ULTRAVIOLET RADIATION ABSORBING COATING	US	08/042184	02-Apr-1993		5328975	12-Jul-1994	An organosiloxysilanemetal oxide sol-gel composition and method for its production are disclosed wherein an organosiloxysilane of the general formula
9573	MULTIPLE CONNECTION TERMINAL ASSEMBLY FOR AN ELECTRICALLY HEATED TRANSPARENCY	US	08/058878	03-May-1993		5340961	06-Aug-1996	
9578	SPACER AND SPACER FRAME FOR AN INSULATING GLAZING UNIT	US	08/064284	20-May-1993		5351451	04-Oct-1994	A substrate having a bead of a moisture and/or gas previous adhesive having a desiccant therein is shaped to provide U-shaped spacer stock. The spacer stock is bent to provide a spacer frame having continuous corners.
9383	NEUTRAL LOW EMISSIVITY COATED GLASS ARTICLES AND METHOD FOR MAKING	US	08/072782	04-Jun-1993		5395698	07-Mar-1995	A coated article and method of producing it are disclosed wherein the iridescence caused by the difference between the refractive index of a transparent substrate and the refractive index of a metal oxide coating is reduced by means of two intermediate layers, the first of which, closest to the substrate, has a refractive index higher than the refractive index of the substrate but lower than the refractive index of the second, and the second has a refractive index higher than the refractive index of the first but lower than the refractive index of the metal oxide coating. The thicknesses of the two intermediate layers for optimizing a neutral appearance are determined by the thickness and refractive index of the metal oxide coating.
9402	GLAZING UNIT HAVING THREE OR MORE GLASS SHEETS AND HAVING A LOW THERMAL EDGE, AND METHOD OF MAKING SAME	US	08/102596	05-Aug-1993		5531047	02-Jul-1996	A glazed unit having three sheets includes a pair of outer glass sheets secured to outer legs of a spacer having a generally U-shaped cross section. On the base of the spacer between the outer legs is provided a layer of pliable material having a generally U-shaped cross section and having a desiccant therein. A third or intermediate glass sheet has its edge portion in the groove formed by the layer of pliable material. Movement of the third sheet toward an outer glass sheet is limited by the cooperation of the layer of the pliable material and portion of the outer legs of the spacer at the corners of the unit bent inwardly to move the layer of pliable material at the corner toward the unit during fabrication of the unit. A nozzle for depositing the shaped layer of the pliable material includes a platform having a shaping tip. The shaping tip has converging sides at one end and generally parallel sides at the other end. The portion of the tip at the first end has a lower elevation than the portion of the tip at the second end. Holes for moving the pliable material are provided in the platform on each side of the tip and in tips intermediate its ends. The different elevation and converging and intercuses if not eliminates tailing. A method is also discussed for making the triple glazed unit using the nozzling to provide the shaped layer of pliable material. An injector arrangement fills the unit with an insulating gas e.g. Argon.
9406	REDUCTION OF NICKEL SULFIDE STONES IN A GLASS MELTING OPERATION	US	08/106367	13-Aug-1993		5491287	28-Mar-1996	Material selected from the group consisting essentially of molybdenum, arsenic, antimony, bismuth, copper, silver, potassium dichromate and iron chromite, is added during the manufacture of soda-lime-silica float glass to reduce the occurrence of nickel sulfide stone defects. Material is added in sufficient amounts such that the resulting glass is at least 0.010 wt. % of the selected material. In a preferred embodiment of the invention, molybdenum is added in the form of sodium molybdate such that the resulting glass is at least 0.015 wt. % molybdenum.

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Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
9421	DARK GRAY, INFRARED ABSORBING GLASS COMPOSITION AND COATED GLASS FOR PRIVACY GLAZING	US	08/139949	19-Oct-1993		5393593	28-Feb-1995	A neutral, dark gray, soda-lime-silica glass having luminous transmittance less than 35 percent, infrared transmittance less than 20 percent, and total solar energy transmittance less than 20 percent (all at 3.9 millimeter thickness) is produced with colorants consisting essentially of 1.0 to 2.2 percent by weight total iron, at least 0.20 percent FeO, 0.05 to 0.65 percent CoO, and 0.0005 to 0.005 percent Se. The flat glass product having such a composition is particularly suitable for use as privacy glazing. The use of the glass as a substrate for a reflectively coated product is also disclosed. A low transmittance, reflective coated article is disclosed comprising a soda-lime-silica glass substrate having luminous transmittance less than 35 percent, infrared transmittance less than 20 percent, and total solar energy transmittance less than 22 percent (all at 3.9 millimeter thickness) and a metal oxide coating having a luminous reflectance no more than 35 percent from the coated surface, and not more than 8 percent from the uncoated surface. The low transmittance coated glass product is particularly suitable for use as privacy glazing.
9425	HEAT LOAD REDUCTION WINDSHIELD	US	08/139859	20-Oct-1993		5902505	11-May-1999	A multiple-layer, high transmittance, low emissivity coated article is disclosed comprising at least two infrared reflective metal layers alternatingly combined with at least three metal oxide antireflective layers to produce a coating with superior low emissivity and low visible reflectance, especially for use to reduce heat load in automobiles, where the coating furthermore is electroconductive for use in an electrically heatable transparency.
9456	GLASS SHEET QUENCH	US	08/178877	07-Jan-1994		5507852	16-Apr-1996	The present invention provides a quench for cooling hot sheet material. The quench includes a plurality of generally horizontally extending, spaced apart nozzle assemblies, each having a longitudinally extending air supply conduit. An orifice extending to an outer surface of the conduit. A first plenum is interconnected to a first end of each of the conduits and a second plenum is interconnected to a second end of each of the conduits to allow cooling fluid to pass from the plenums into each of the nozzle assemblies through the conduit. The plenums are located at positions spaced laterally outward from the nozzle assemblies.
9457	METHOD AND APPRATUS FOR PROCESSING A GLASS SHEET	US	08/178878	07-Jan-1994		5470366	28-Nov-1995	The present invention provides a glass sheet shaping arrangement whereby a glass sheet may be conveyed through a shaping station without being shaped and deposited into a glass collector beneath an upstream portion of the adjacent quench without impairing the lower quench or interfering with the operation of the quench. A furnace, shaping station and cooling station are all linearly aligned so that a glass sheet progresses through the glass sheet shaping arrangement without changing its advancing direction. A glass sheet is conveyed in a first direction along a first generally horizontal plane through the furnace to heat the sheet to its heat softening temperature. The sheet continues into the shaping station where it is lifted into engagement with an upper vacuum surface. A ring member moves along a second generally horizontal plane in a direction which is linearly aligned with the first direction, from a first position between an upper and lower quench in the cooling station to a second position within the shaping station beneath the upper vacuum surface. Vacuum is terminated along the upper surface, depositing the sheet on the ring. The shaped sheet is cooled by moving the ring from the second position within the shaping station along the second plane to the first position within the cooling station. The second plane is vertically offset relative to the first plane such that the first plane is beneath a portion of the lower quench which is immediately adjacent the shaping station. With this arrangement, the glass sheets may be conveyed through the shaping station and into the collector without interfering with any further production.
9508	SPACER AND SPACER FRAME FOR AN INSULATING GLAZING UNIT AND METHOD OF MAKING SAME	US	08/254123	06-Jun-1994		5511013	26-Mar-1996	A substrate having a bead of a moisture and/or gas pervious adhesive having a desiccant therein is shaped to provide U-shaped spacer stock. The spacer stock is bent to provide a spacer frame having continuous corners.
9509	LOW THERMAL CONDUCTING SPACER ASSEMBLY FOR AN INSULATING GLAZING UNIT AND METHOD OF MAKING SAME	US	08/255541	06-Jun-1994		5675944	14-Oct-1997	An insulating unit has a pair of glass sheets about an edge assembly to provide a compartment between the sheets. The edge assembly has a U-shaped spacer made of metal, metal coated plastic, gas and moisture impervious polymer, or gas and moisture impervious film coated polymer. The outer legs of the spacer and the glass provide a long diffusion path to limit the diffusion of argon gas out of the compartment. The edge assembly has materials selected and sized to provide edge assembly having an R/S value of at least 75.

Schedule A, Part 2 - Expired/Abandoned Flat Glass Patents

Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
9515	METHOD FOR COATING A MOVING GLASS SUBSTRATE	US	08/264816	23-Jun-1994		5464667	07-Nov-1995	A method for coating a moving substrate provides a coating having a chemical composition which varies con ou from the interface with he substrate to the opposite surface of the coating. The method involves directing a vapo coating composition toward a substrate surface and moving portions of the vapor in opposite directions. A vapor mixture may include a tin-containing precursor and a silicon-containing precursor. An accelerant, e.g., a phosphor containing precursor, may be used with the metal-containing precursors to increase the deposition rate of the coa The coating deposited on the substrate has regions of continuously varying weight percent of silicon oxide and ti as the distance from the substrate-coating interface increases, with the surface of the coating farthest from the s coating interface being predominantly tin oxide. The regions of varying composition provide the coating with varyi indices of refraction to eliminate iridescence to provide a coated article, particularly a tin oxide coated glass articl a neutral color.
9542	MASK FOR COATED GLASS	US	08/312175	26-Sep-1994		5482750	09-Jan-1996	A removable mask to be used in a coating operation to cover selected portions of a substrate from being coated at minimize ghosting about the periphery of the coating. The mask includes first member having a configuration wh generally approximates the area of the substrate to be covered and an edge portion which closely follows the des peripheral shape of said coating, and a second member underlying at least a portion of the first member and hav edge portion which precisely corresponds to the desired peripheral shape of the coating. In one particular structu edge portion of he second member is no greater than 0.050 inches thick, and preferably no greater than 0.010 i thick, to minimize any ghosting of he coating about its periphery caused by the second member. In addition, the distance between he edge portions is sufficient to eliminate any shading of the coating about its periphery caused by the first member.
9544	LOW PROFILE SPRAY ASSEMBLY	US	08/316145	30-Sep-1994		5547129	20-Aug-1996	The present invention provides a multiple nozzle liquid spray assembly having a longitudinally extending bar member, receivers to allow securing of nozzles along the bar, a coolant conduit extending along at least a portion of he bar, liquid and gas conduits extending along the bar in close proximity to each of the receivers, and first and second sets of passages interconnecting each of he receivers wi h the liquid or gas conduits. In one pa ticular embodiment of the invention, the coolant conduit includes a first portion which extends from a coolant inlet along a first longitudinal side of he bar member and a second portion which extends from a coolant outlet along an opposing longitudinal side of the bar member. The liquid conduit and gas conduit generally parallel each other and extend along the bar member between he first and second portions of the cooling conduit.
9548	PRESSURE FORMING OF GLASS SHEETS	US	08/329480	14-Oct-1994		5669962	23-Sep-1997	The present invention discloses a method for shaping glass sheets to deeply sagged configurations using a lower outline mold and an upper shaping mold while minimizing marking of he sheets by shaping molds. The outline mold includes a support rail which generally corresponds to the desired curvature of a peripheral portion of the sheets to be shaped and supports the glass sheets as they are heated and sagged by gravity to a preliminary shape. The outline mold and the upper mold are then moved relative to each other to position the molds at her in close proximity to each other or to press the upper mold against the glass sheets. Pressurized gas is then directed from the mold to at least the unsupported central portions of the preliminarily shaped sheets, to urge these unsupported portions downward and shape the sheets to a desired configuration.
9551	MULTI-SHEET GLAZING UNIT AND METHOD OF MAKING SAME	US	08/326565	20-Oct-1994		5553440	10-Sep-1996	A multi-sheet glazing unit has a pair of outer glass sheets spaced from one another and secured to a spacer frame having a generally U-shaped cross section defined by outer legs secured to a base. The recess of a sheet retaining member is mounted on peripheral edge portions of an intermediate glass sheet. The intermediate glass sheet and sheet retaining member are mounted within the outer legs of the spacer frame to posi on the intermediate sheet between and spaced from the outer sheets. A method of making multi-sheet units is also disclosed.
9552	MULTI-SHEET GLAZING UNIT AND METHOD OF MAKING SAME	US	08/326560	20-Oct-1994		5644894	08-Jul-1997	A multi-sheet glazing unit has a pair of outer sheets spaced from one another and secured to a spacer frame. The spacer frame has a generally U-shaped cross section and raised portions on its base to define a recess. Peripheral and marginal edge portions of an intermediate sheet are positioned in the recess and held in position by the recess spaced from the outer sheets. A method of forming the unit is also disclosed.

Schedule A, Part 2 - Expired/Abandoned Flat Glass Patents

Case No.	Title	Country	App. No.	Filing Date	Pub. No.	Patent No.	Issue Date	Abstract
8669	WATER REPELLENT SURFACE TREATMENT WITH INTEGRATED PRIMER	US	08/365893	27-Dec-1994		5523161	04-Jun-1996	An article is disclosed comprising a substrate of glass, plastic, metal, organic polymer coated substrates and coated substrates, wherein at least a portion of the substrate is treated with a composition comprising a mixture of perfluoroalkylsilane and a compatible hydrolyzable silane. The perfluoroalkylsilane provides water repellency to the substrate surface, while the fully hydrolyzable silane hydrolyzes and condenses to form a matrix which imparts resistance to weathering and abrasion, thus improving the durability of the water and soil repellent properties. The method of providing such a durable rain and soil repellent surface comprises contacting the substrate surface with a composition comprising said perfluoroalkylsilane and fully hydrolyzable silane, and may include applying a layer of primer on the substrate surface, then contacting the substrate surface with a composition comprising said perfluoroalkylsilane and fully hydrolyzable silane.
8681	A NOZZLE FOR USE IN THE FABRICATION OF A GLAZED UNIT HAVING THREE OR MORE SHEETS	US	08/365892	27-Dec-1994		5566631	15-Oct-1996	A nozzle for depositing the stepped layer of the powder material includes a platform having a stepping lip. The platform has converging sides at one end and generally parallel sides at the other end. The portion of the lip at the final deposition location from the portion of the lip at the second end. Hopper for moving the powder material onto the platform on each side of the lip and in the intermediate area between the sides. The different embodiments are disclosed.
8683	MULTILAYER ANTIREFLECTIVE COATING WITH A GRADED BASE LAYER	US	08/364148	27-Dec-1994		5611191	23-Sep-1997	An antireflective coating is disclosed comprising a first graded layer wherein the composition is varied throughout the thickness of the layer such that the optical index of the graded layer varies from a low refractive index approximating the refractive index of the substrate at the interface of the graded layer and the substrate to a higher index at the surface of the graded layer opposite the interface with the substrate, and a second substantially homogeneous layer of a composition selected to have a refractive index which is approximately the square root of the higher refractive index of the graded layer and the refractive index of the incident medium at the interface of the second layer opposite the interface of the graded layer with the substrate. The first layer preferably has a thickness of at least one quarter of a selected design wavelength. The antireflective properties of the coating are preferably optimized for a selected design wavelength by incorporating, between the first and the second substantially homogeneous layer, an intermediate layer having a refractive index and an optical thickness of about half the design wavelength.
8689	GLASS ANTENNA FOR VEHICLE WINDOW	US	08/364369	27-Dec-1994		5670969	23-Sep-1997	The present invention provides a transparent antenna for an automobile. The antenna includes a glass substrate, a conductive antenna element positioned on a central portion of a major surface of said substrate, a pair of electrically conductive antenna element positioned on the major surface of the substrate, spaced from the first element, at least one electroconductive connector extending between the antenna elements and connecting said elements in parallel with a portion of both the first and second antenna elements. A pair of the connector elements for periphery of the glass substrate to be connected to an external connector. The first element and preferably elements are a transparent, electroconductive coating. In one particular embodiment of the invention, the first element from the peripheral edge of the substrate and the second element is positioned between the first element and the substrate edge. The antenna may be manufactured with a distributed capacitance that an additional is supplied to the first glass substrate such that the first and second coating elements are positioned between plies.
8694	ELECTRICAL CONNECTOR	US	08/364171	27-Dec-1994		5586635	31-Dec-1996	
CC-3824	TRANSPARENT WINDOW ANTENNA	US	07/865430	16-Apr-1992		5355144	11-Oct-1994	A slot antenna formed in combination with a vehicle window. An electrically conducting, optically transparent is bonded to the window and terminates so that its outer peripheral edge is spaced from the innermost edge of framing the window to define a polygonal antenna slot between the edges. An unbalanced transmission line is connected to the antenna by connecting the grounded conductor to the framing metal near the metal edge an the ungrounded conductor to the conductive pane near the juxtaposed, interfering edge of the conductive pat

NOTARIA PÚBLICA No. 3
TITULAR
LIC. OSCAR EDMUNDO ALANIS
MONTERREY, NUEVO LEÓN, MÉXICO
PRIMER TESTIMONIO

PATENT ASSIGNMENT

THIS PATENT ASSIGNMENT (hereinafter, the "Assignment") is made and entered into as of the 13th day of November, 2018 by and between Vitro, S.A.B. de C.V., a Mexican corporation having a principal place of business at Av. Ricardo Margain Zozaya #400, ,Col. Valle del Campestre, San Pedro Garza Garcia, Nuevo Léon , México 66265 (hereinafter "Vitro S.A.B."), and Vitro Flat Glass LLC , a Delaware corporation having a principal place of business at 400 Guys Run Road, Cheswick, Pennsylvania, USA (hereinafter "Vitro Flat Glass"). Capitalized terms used but not defined herein shall have the meanings given to the term in the Purchase Agreement dated as of June 30, 2018, by and among Vitro, S.A.B. de C.V. and Vitro Flat Glass LLC ("Purchase Agreement").

WHEREAS, Vitro, S.A.B. is the owner of all right, title, and interest in and to U.S. Patent Application Serial No. 15/240,437 for LOW EMISSIVITY COATING FOR WINDOWS IN COLD CLIMATES (hereinafter the "Application");

WHEREAS, Vitro Flat Glass is desirous of acquiring all of Vitro S.A.B.'s right, title, and interest in and to the Application pursuant to the terms of the Purchase Agreement.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Vitro S.A.B. has sold, conveyed, assigned, transferred, and set over to Vitro Flat Glass, its successors, legal representatives and assigns, Vitro S.A.B.'s entre right, title, and interest in and to the Applications and the inventions disclosed in the Applications as well as world-wide rights; and all patents which may be granted thereon; and all applications for patents which may hereafter be filed for inventions embodied by said Applications, and all patents which may be granted for said inventions; and all extensions, renewals, continuations, continuations-in-part, reexaminations, foreign counterparts and reissues which may be granted therefrom; together with (A) the right to prosecute, maintain and defend the Applications before any public or private agency, office or registrar including by filing reissues, reexaminations, divisions, continuations, continuations-in-part, substitutes, extensions and all other applications relating to the Applications; (B) all rights of priority based upon the filing of said applications which are created by any law, treaty, or international convention; and (C) the full rights to sue, including all causes of action (whether known or unknown or whether currently pending, filed, or otherwise) and other enforcement rights for (i) damages. (ii) injunctive relief, (iii) any other remedies of any kind (in each of cases (i), (ii) and (iii) for past, present or future infringement of any of the patents issuing from the Applications), (iv) all rights to collect royalties and other payments under or on account of any of the patents issuing from the Applications, and (v) the right to fully and entirely stand in the place of Vitro S.A.B. in all matters related thereto; these rights to be held and enjoyed by Vitro Flat Glass, its successors and assigns, as fully as the same would have been held and enjoyed by Vitro S.A.B. had this Assignment not be made; and Vitro S.A.B. hereby authorizes and requests the Commissioner for Patents of the United States, and any official of any country or countries foreign to the United States, whose duty is to issue patents

MDC

on any such applications as aforesaid, to issue all patents for said inventions to Vitro Flat Glass, its successors, legal representatives and assigns, in accordance with the terms of this instrument.

This Assignment shall be governed, including as to validity, interpretation and effect, by, and construed in accordance with, the internal laws of the Commonwealth of Pennsylvania applicable to agreements made and fully performed with the Commonwealth of Pennsylvania, without reference to its choice of laws principles.

IN WITNESS WHEREOF, each of the parties hereto has caused this Assignment to be executed on its behalf by its duly authorized officers or representatives on the date first above written.

VITRO, S.A.B. de C.V.

By _____
Name: Javier Arechavaleta Santos
Title: Attorney in Fact
Date: November 13, 2018

On this 13 day of noviembre, 2018, before me, a notary public, the undersigned officer, personally appeared JAVIER ARECHAVALETA SANTOS, known to be (or satisfactorily proven) to be the person whose name is subscribed to the foregoing instrument and acknowledges that he/she executed the same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

LIC. OSCAR ELIZONDO ALONSO
Notary Public No. 25

NOTARIA PÚBLICA No. 25
T I T U L A R
LIC. OSCAR ELIZONDO ALONSO
MONTERREY, NUEVO LEON, MEXICO
PRIMER DISTRITO

ACTA NUMERO: (025/117,770/18) LEVANTADA FUERA DE PROTOCOLO.

EN LA CIUDAD DE MONTERREY, CAPITAL DEL ESTADO DE NUEVO LEÓN, a los 13 trece días del mes de noviembre de 2018 (dos mil dieciocho), Yo, Licenciado OSCAR ELIZONDO ALONSO, Notario Público Titular de la Notaría Pública número 25 veinticinco, con ejercicio en la Demarcación Notarial correspondiente al Primer Distrito Registral, con Residencia en ésta Ciudad, HAGO CONSTAR:- Que compareció el Licenciado JAVIER ARECHAVALETA SANTOS, en representación de la Sociedad "VITRO", SOCIEDAD ANÓNIMA BURSÁTIL DE CAPITAL VARIABLE, y Manifestó que reconoce como suya y de su puño y letra la firma con que la calza en el presente documento, dando por generales las siguientes:- Mexicano, mayor de edad, casado, Profesionista, al corriente en el pago del Impuesto sobre la Renta, sin justificarlo y con Registro Federal de Contribuyentes número AESJ-640520-IH2, con Clave Única de Registro de Población AESJ-640520HNLRN-V01, y con domicilio convencional en Avenida Ricardo Margain número 400, Colonia Valle del Campestre, en San Pedro Garza García, Nuevo León y de paso en ésta Ciudad, identificándose con Credencial de Elector con Fotografía número 0410062722391, expedida por el Instituto Federal Electoral.----------

PERSONALIDAD:

El señor Licenciado JAVIER ARECHAVALETA SANTOS, acredita el carácter con que se ostenta, así como la existencia y subsistencia legal de la Sociedad "VITRO", SOCIEDAD ANÓNIMA BURSÁTIL DE CAPITAL VARIABLE, con los siguientes documentos:----------

-- (i).- CARÁCTER CON QUE COMPARECE:- con el Primer Testimonio de la Escritura Pública número 8,666 de fecha 13 de octubre de 2015, pasada ante la fe del suscrito Notario, relativa a la Protocolización de Acta de Sesión de Consejo de administración de fecha 21 de septiembre de 2015, en la que, se acordó otorgamiento de poderes y facultades. El Primer Testimonio de la Escritura de referencia, se encuentra inscrito bajo el folio mercantil electrónico número 11062*9, control interno 84, Sección Comercio, con fecha 23 de octubre de 2015. Dicho documento copio en lo conducente lo siguiente:"....- ORDEN DEL DIA... Otorgamiento y Revocación de Poderes...- 2.- Se otorga poder general a favor del Lic. Javier Arechavaleta Santos, para que actúe en nombre y representación de la Sociedad, confiriéndole para tal efecto las siguientes facultades: - a).-Poder General para administrar los negocios y bienes sociales, con el poder más amplio de Administración, en los términos de los artículos 2448 párrafo segundo del Código Civil para el Estado de Nuevo León, 2554 párrafo segundo del Código Civil Federal y sus correlativos de los Códigos Civiles de todos los Estados de la República Mexicana y del Distrito Federal. En virtud del presente poder no se entiende conferida facultad alguna a favor del apoderado para emitir, aceptar, endosar, avalar y/o llevar cabo cualquier otra operación consignada en los títulos de crédito, así como para realizar operaciones de crédito y/o bancarias a nombre y en representación de la Sociedad.- Podrá conferir o revocar Poderes Generales y Especiales con facultades para actos de Administración dentro de las establecidas a su favor - b).-Poder General para Pleitos y Cobranzas, mismo que se otorga con todas las facultades generales y las especiales que de acuerdo con la Ley requiera poder o cláusula especial, sin limitación alguna, en los términos del artículo 2448 primer párrafo del Código Civil para el Estado de Nuevo León y del primer párrafo del artículo 2554 y 2587, del Código Civil Federal, y sus correlativos de los Códigos Civiles de todos los Estados de los Estados Unidos Mexicanos y del Distrito Federal. De manera enunciativa, pero no limitativa, se citan entre otras facultades las siguientes: ejercitar toda clase de derechos y acciones ante cualquier persona ya sean físicas o morales y representar a la Sociedad ante toda clase de autoridades nacionales y extranjeras ya sean Federales, Estatales, Municipales o de cualquier otro fuero, representando a la Sociedad tanto dentro como fuera de juicio, ya sea en aquellos de jurisdicción voluntaria, contenciosa como mixta, se trate de organismos y autoridades civiles, penales, judiciales, administrativas, o del trabajo, sean estas últimas Juntas de Conciliación o Tribunales de Arbitraje, locales o federales en toda la extensión de los Estados Unidos Mexicanos y en el extranjero, incluyendo sin que se entienda limitativamente, a representar a la Sociedad ante la Secretaría de Hacienda y Crédito Público, la Secretaría de Economía, el Servicio de Administración Tributaria, el Instituto Mexicano del Seguro Social, el Instituto del Fondo Nacional de la Vivienda para los Trabajadores, el Instituto Mexicano de la Propiedad Industrial, así como sus respectivas Direcciones y demás dependencias, la Secretaría de Relaciones Exteriores en cuanto a transmisión de cartas rogatorias por conductos oficiales se refiera, etcétera, iniciar, seguir y concluir todo tipo de trámites y procedimientos contenciosos o voluntarios; promover, seguir y comparecer en todo tipo de juicios y procedimientos, ya sean de carácter civil, mercantil, administrativo, laboral o penal, incluyendo el promover juicio de amparo, presentar y contestar demandas, oponer excepciones, reconvenir, ofrecer pruebas, interponer toda clase de recursos ordinarios o extraordinarios para impugnar todo tipo de autos y sentencias, ya sean definitivas o interlocutorias, acuerdos, resoluciones, laudos, etcétera y/o consentir los mismos, alegar en audiencias, designar peritos e impugnar los de la contraria, tachar testigos; someterse a cualquier jurisdicción; articular y absolver posiciones, recusar magistrados, jueces, secretarios, y demás personas en derecho recusables sin causa, con causa o bajo protesta de Ley; desistirse de lo principal, de la acción y/o de la instancia de todo tipo de juicios, y de sus incidentes, de cualquier recurso y del Juicio de Amparo inclusive, el cual podrán promover cuantas veces lo estimen conveniente; rendir toda clase de pruebas; nombrar y/o recusar peritos; reconocer firmas y documentos, objetar éstos y redargüirlos de falsos en su caso; recibir pagos y valores en casos de cobranza judicial y extrajudicial que realice, otorgar recibos, transigir y comprometer en árbitros; asumir soluciones conciliatorias que obliguen a la Sociedad, asistir a juntas, diligencias y almonedas; hacer y presentar posturas, pujas y mejoras y obtener para la Sociedad mandante la adjudicación de toda clase de bienes y por cualquier título; formular acusaciones, denuncias y querellas, ya sea respecto de hechos que pudiesen constituir delitos que se persigan de oficio o a instancia de parte y constituirse en parte civil ofendida en causas criminales y/o en coadyuvantes del Ministerio Público, causas en las cuales podrán ejercitar las más amplias facultades que el caso requiera incluyendo, sin que se entienda como limitante, el exigir el pago de la responsabilidad por daños morales y/o patrimoniales y otorgar perdones cuando lo ameriten.- Podrá conferir o delegar Poderes Generales y Especiales con facultades para Pleitos y Cobranzas dentro de las establecidas a su favor....."----------

CA No. 25
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IDO ALONSO
EÓN, MEXICO
TRITO

--(ii).- CONSTITUTIVA:- Con el primer testimonio de la Escritura Pública Número 158 (ciento cincuenta y ocho), de fecha 27 (veintisiete) de agosto de 1936 (mil novecientos treinta y seis), otorgada ante la fe del Notario Público que ejerció en este Municipio, señor Licenciado Carlos Hinojosa Guajardo y registrada bajo el número 139 (ciento treinta y nueve), volumen 82 (ochenta y dos), libro número 3 (tres), Segundo Auxiliar y su hoja de Matrícula con el número 53 (cincuenta y tres), folio 171 (ciento setenta y uno), volumen 9 (nueve), Libro número 1 (uno), Sección de Matrículas, ambas inscripciones con fecha 3 (tres) de octubre de 1936 (mil novecientos treinta y seis) en el Registro Público de la Propiedad y del Comercio de este Municipio, por medio de la cual se constituyó "FOMENTO DE INDUSTRIA Y COMERCIO", SOCIEDAD ANÓNIMA, después "VITRO", SOCIEDAD ANÓNIMA; "VITRO", SOCIEDAD ANÓNIMA DE CAPITAL VARIABLE ahora "VITRO", SOCIEDAD ANÓNIMA BURSÁTIL DE CAPITAL VARIABLE, con domicilio en esta ciudad, su duración de 50 (cincuenta) años; con un capital inicial de $1'000,000.00 (UN MILLÓN DE PESOS 00/100 MONEDA NACIONAL).----------

--(iii).- CAMBIO DE DENOMINACIÓN:- Con el primer testimonio de la Escritura Pública Número 19,528 (diecinueve mil quinientos veintiocho), de fecha 9 (nueve) de mayo de 1980 (mil novecientos ochenta), otorgada ante la fe del Notario Público Número 12 (doce) que ejerció en este Municipio, señor Licenciado Fernando Méndez López, y registrada bajo el número 1224 (mil doscientos veinticuatro), Volumen 117 (ciento diecisiete), Libro número 4 (cuatro), Tercer Auxiliar, Actos y Contratos Diversos, Sección de Comercio, con fecha 9 (nueve) de junio de 1980 (mil novecientos ochenta) en el Registro Público de la Propiedad y del Comercio de este Municipio, relativa a la protocolización de una Acta de Asamblea General Extraordinaria de Accionistas, por medio de la cual se acordó cambiar la denominación de la Sociedad de FOMENTO DE INDUSTRIA Y COMERCIO, SOCIEDAD ANÓNIMA a VITRO, SOCIEDAD ANÓNIMA, aumentar el Capital Social de la Sociedad a la cantidad de $2,000'000,000.00 (DOS MIL MILLONES DE PESOS MONEDA NACIONAL) y reformar las cláusulas Primera, Sexta, Séptima, Décima Primera y agregar la Trigésima Octava de los Estatutos Sociales, previos permisos de la Secretaría de Relaciones Exteriores número 20418 (veinte mil cuatrocientos dieciocho), Expediente número 20280 (veinte mil doscientos ochenta), de fecha 24 (veinticuatro) de abril de 1980 (mil novecientos ochenta) y número 10833 (diez mil ochocientos treinta y tres), Expediente número 20280 (veinte mil doscientos ochenta), de fecha 28 (veintiocho) de febrero de 1980 (mil novecientos ochenta).----------

--(iv).-TRANSFORMACIÓN:- Con el primer testimonio de la Escritura Pública Número 61,366 (sesenta y un mil trescientos sesenta y seis), de fecha 30 (treinta) de marzo de 1998 (mil novecientos noventa y ocho), otorgada ante la fe del Notario Público Número 129 (ciento veintinueve) con ejercicio en el Municipio de San Pedro Garza García, Nuevo León, Lic. Juan Manuel García García, Asociado a la Notaría Pública Número 62 (sesenta y dos) a cargo del Lic. Manuel García Cirilo y actuando en el Protocolo de éste último, y registrada bajo el número 2,091 (dos mil noventa y uno), Volumen 207-42 (doscientos siete guión cuarenta y dos), Libro No. 4 (cuatro), Tercer Auxiliar, Actos y Contratos Diversos, Sección de Comercio, con fecha 1°. (primero) de abril de 1998 (mil novecientos noventa y ocho) en el Registro Público de la Propiedad y del Comercio de este Municipio, relativa a la Protocolización de una Acta de Asamblea General Extraordinaria de Accionistas de fecha 26 (veintiséis) de marzo de 1998 (mil novecientos noventa y ocho), por medio de la cual se acordó Transformar a la Sociedad en Sociedad Anónima de Capital Variable y reformar en lo general los Estatutos Sociales, principalmente para adecuarlos a las disposiciones legales de la Ley del Mercado de Valores.----------

--(v).- REFORMA:- Con el Primer Testimonio de la Escritura Pública número 17,738 (diecisiete mil setecientos treinta y ocho) de fecha 7 de diciembre de 2006 (dos mil seis), pasada ante la fe del suscrito Notario, relativa a la protocolización de acta de Asamblea General Extraordinaria de Accionistas, de fecha 29 de noviembre de 2006, en la que, se acordó consideración y resolución acerca de un proyecto para reformar las Cláusulas Primera, Segunda, Tercera, Cuarta, Quinta, Sexta, Séptima, Octava, Novena, Décima, Décima Primera, Décima Tercera, Décima Cuarta, Décima Quinta, Décima Sexta, Décima Séptima, Décima Octava, Décima Novena, Vigésima, Vigésima Segunda, Vigésima Tercera, Vigésima Cuarta, Vigésima Quinta, Vigésima Sexta, Vigésima Novena, Trigésima, Trigésima Primera, Trigésima Segunda, Trigésima Tercera, Cuadragésima Primera y Cuadragésima Segunda de los estatutos sociales, a efecto de adecuarlos a la Ley del Mercado de Valores, dentro de las que se incluye el establecimiento de las medidas a que se refiere el Artículo 48 de dicho ordenamiento legal; acuerdos complementarios. El Primer Testimonio de la Escritura de referencia, se encuentra inscrito bajo el Folio Mercantil Electrónico número 1062*9, control interno 63, Sección Comercio, de fecha 15 (quince) de diciembre de 2006 (dos mil seis), en el Registro Público de Comercio de esta Ciudad.----------

(vi).- FUSION:- Con el Primer Testimonio de la Escritura Pública número 6,235 (seis mil doscientos treinta y cinco) de fecha 9 (nueve) de septiembre de 2013 (dos mil trece), relativa a la protocolización del acta de la Asamblea General Extraordinaria de Accionistas de la Sociedad de fecha 5 de septiembre de 2013, en la que se acordó una propuesta para reducir la parte variable del capital social de la Sociedad; reformar la Cláusula Segunda y la Cláusula Quinta de los estatutos sociales; un proyecto relativo a la fusión por vía de incorporación de Vitro, S.A.B. de C.V., como sociedad fusionante, con FIC Regiomontano, S.A.P.I. de C.V. y Compañía Vidriera, S.A. de C.V., como sociedades fusionadas El Primer Testimonio de la Escritura en referencia, se encuentra inscrito bajo el Folio Mercantil Electrónico número 1062*9, control interno 42, Sección Comercio, de fecha 13 (trece) de septiembre de 2013 (dos mil trece), en el Registro Público de Comercio de esta Ciudad.----------

DE LO ANTERIOR QUEDA CONSTANCIA BAJO EL NUMERO (028,117,770/18) DEL LIBRO DE CONTROL DE ACTAS LEVANTADAS FUERA DE PROTOCOLO QUE OBRA EN ESTA NOTARIA A MI CARGO.- DOY FE.----------

LIC. OSCAR ELIZONDO ALONSO
NOTARIO PUBLICO TITULAR NUMERO 25
EIAO-720522 PY6

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NOTARIA PÚBLICA No. 25
TITULAR
LIC. OSCAR ELIZONDO ALONSO
MONTERREY, NUEVO LEÓN, MÉXICO

NOTARIA P
T I T
LIC. OSCAR EL
MONTERREY, NL
PRIMER

VITRO FLAT GLASS, LLC

By Richard A. Beuke

Name: Richard A. Beuke

Title: President, Vitro Flat Glass LLC

Date: 12-5-2018

State of Pennsylvania
County of Allegheny

On this 5th day of December, 2018, before me, a notary public, the undersigned officer, personally appeared Richard A. Beuke, known to be (or satisfactorily proven) to be the person whose name is subscribed to the foregoing instrument and acknowledges that he/she executed the same for the purposes therein contained.

In witness whereof, I hereunto set my hand and official seal.

Erika Morgovich

Notary Public

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Erika Morgovich, Notary Public
Ross Twp., Allegheny County
My Commission Expires April 13, 2019
MEMBER, PENNSYLVANIA ASSOCIATION OF NOTARIES