

<b>PATENT ASSIGNMENT COVER SHEET</b>
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Electronic Version v1.1  
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EPAS ID: PAT6768299

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	CONFIRMATION OF FORECLOSURE TRANSFER OF PATENT RIGHTS

**CONVEYING PARTY DATA**

Name	Execution Date
UTICA LEASECO, LLC SECURED PARTY	04/25/2019

**RECEIVING PARTY DATA**

<b>Name:</b>	UTICA LEASECO, LLC ASSIGNEE
<b>Street Address:</b>	905 SOUTH BOULEVARD EAST
<b>City:</b>	ROCHESTER HILLS
<b>State/Country:</b>	MICHIGAN
<b>Postal Code:</b>	48307

**PROPERTY NUMBERS Total: 1**

Property Type	Number
<b>Application Number:</b>	17347314

**CORRESPONDENCE DATA**

**Fax Number:** (202)857-6395  
*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.*

**Phone:** 2028576000  
**Email:** gregory.forbes@arentfox.com,patentdocket@arentfox.com  
**Correspondent Name:** ARENT FOX LLP  
**Address Line 1:** 1717 K ST NW  
**Address Line 4:** WASHINGTON, D.C. 20006

<b>ATTORNEY DOCKET NUMBER:</b>	041223.00565
<b>NAME OF SUBMITTER:</b>	GREGORY M. FORBES
<b>SIGNATURE:</b>	/Gregory M. Forbes/
<b>DATE SIGNED:</b>	06/17/2021

**Total Attachments: 32**

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## Confirmation of Foreclosure Transfer of Patent Rights

This Confirmation of Foreclosure Transfer of Patent Rights (this **Confirmation**) is dated February 25, 2021 and is executed by Utica Leaseco, LLC, a Florida limited liability company (the **Secured Party**).

### Recitals

Pursuant to a Master Lease Agreement dated February 6, 2017, and an Equipment Schedule ALTA-0002 dated April 25, 2019, the Secured Party extended credit to Alta Devices, Inc., a Delaware corporation (the **Debtor**). As security for the credit extended by the Secured Party to the Debtor, the Debtor granted to the Secured Party a security interest under the Uniform Commercial Code in collateral including the following intellectual property and patents (the **Patent Collateral**):

- (a) Each patent and patent application listed in Schedule A attached hereto.
- (b) All reissues, substitutes, divisions, continuations, continuations-in-part, extensions, renewals, reexaminations, counterpart foreign applications, and any other applications claiming priority in the patent and patent application listed in Schedule A attached hereto.
- (c) All inventions and improvements described and claimed therein.

The Debtor executed a Confirmation of Security Agreement on April 25, 2019; that Confirmation was recorded with the USPTO on April 29, 2019, at Reel 049027, Frame 0944.

The Debtor defaulted in the payment and performance of the obligations secured by the Patent Collateral, whereupon the Secured Party, in the exercise of its rights as a secured party under the Uniform Commercial Code, gave notice to the Debtor that the Secured Party would conduct a public foreclosure sale of the Patent Collateral. The Secured Party gave notice to the Debtor of the planned foreclosure sale on February 21, 2020 by certified mail, return receipt requested. The Secured Party also sent that notice to Hanergy Thin Film Power Group Limited and all other parties entitled to such notice under Section 9-611 of the Uniform Commercial Code.

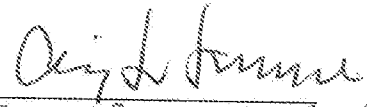
The Secured Party conducted the foreclosure sale on Tuesday, March 3, 2020, at 9:15 a.m., at 660 Woodward Avenue, Detroit, Michigan 48226. At the foreclosure sale, the Secured Party (in this capacity, the **Assignee**) was the highest bidder for the Patent Collateral, bidding the sum of \$33,400,000.00 for the Patent Collateral. As a result, the Secured Party, pursuant to Section 9-617(a) of the Uniform Commercial Code, transferred to the Assignee all of the rights of the Debtor in and to the Patent Collateral.


Therefore, this Confirmation confirms that the Assignee has become the owner, free and clear of all liens, security interests, and adverse claims, of all of the Patent Collateral.

In witness whereof, the Secured Party and the Assignee have executed this Confirmation as of the date first written above.

Secured Party  
Utica Leaseco, LLC

Assignee  
Utica Leaseco, LLC

By:   
Name: CRAIG L. STORER  
Title: EXEC. V.P.

By:   
Name: CRAIG L. STORER  
Title: EXEC. V.P.

# SCHEDULE A

Country	App. No.	Filed	Reg. No.	Issued	Title	Status
US	12/725277	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM	Abandoned
PC	PCT/US2011/028546	03/15/2011			VAPOR DEPOSITION REACTOR SYSTEM	Expired
TW	100108927	03/16/2011			VAPOR DEPOSITION REACTOR SYSTEM	Abandoned
US	12/725296	03/16/2010	8,852,696 B2	10/07/2014	METHOD FOR VAPOR DEPOSITION	Granted
US	12/725308	03/16/2010	9,169,554 B2	10/27/2015	WAFER CARRIER TRACK	Granted
PC	PCT/US2011/028551	03/15/2011			WAFER CARRIER TRACK	Closed
TW	100108931	03/16/2011			WAFER CARRIER TRACK	Abandoned
US	12/725314	03/16/2010			HEATING LAMP SYSTEM	Abandoned
US	14/997890	01/18/2016			HEATING LAMP SYSTEM	Abandoned
PC	PCT/US2011/028553	03/15/2011			HEATING LAMP SYSTEM AND METHOD OF USE	Expired
TW	100108933	03/16/2011			HEATING LAMP SYSTEM AND METHOD OF USE	Abandoned
US	12/725318	03/16/2010	8,859,042 B2	10/14/2014	METHODS FOR HEATING WITH LAMPS	Granted
US	12/725332	03/16/2010			REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Abandoned
CN	200980126036.1	05/29/2009			METHOD AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Abandoned
CN	200980149843.5	10/09/2009			CONCENTRIC SHOWERHEAD FOR VAPOR DEPOSITION	Closed
US	13/444645	04/11/2012			METHOD AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Abandoned
EP	09767430.3	05/29/2009			METHOD AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Abandoned
HK	11108217.7	05/29/2009			METHODS AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Abandoned
EP	09819996.1	10/09/2009			CONCENTRIC SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
KR	10-2011-7010497	10/09/2009			CONCENTRIC SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
US	12/475131	05/29/2009			METHODS AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Abandoned
US	12/475169	05/29/2009	8,602,707 B2	12/10/2013	METHODS AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Granted

US	12/5/6797	10/09/2009	9,121,096 B2	09/01/2015	CONCENTRIC SHOWERHEAD FOR VAPOR DEPOSITION	Granted
PC	PCT/US2009/045709	05/29/2009			METHODS AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Closed
PC	PCT/US2009/060260	10/09/2009			CONCENTRIC SHOWERHEAD FOR VAPOR DEPOSITION	Expired
US	61/057788	05/30/2008			METHOD AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Expired
US	61/104283	10/10/2008			METHOD AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Expired
US	61/104284	10/10/2008			METHOD AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Expired
US	61/122591	12/15/2008			VAPOR DEPOSITION REACTOR	Expired
TW	098118062	06/01/2009	1476295	03/11/2015	LEVITATING SUBSTATE CARRIER	Expired
TW	98134405	10/09/2009			METHODS AND APPARATUS FOR A CHEMICAL VAPOR DEPOSITION REACTOR	Granted
CA	2,739,327	10/12/2009			CONCENTRIC SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
CN	200980126340.6	05/29/2009			MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
HK	200980126340.6	05/29/2009			EPITAXIAL LIFT OFF STACKS AND METHODS	Abandoned
CN	200980140141.0	10/12/2009			EPITAXIAL LIFT OFF STACKS AND METHODS	Abandoned
US	14/723223	05/27/2015	9,679,814 B2	06/13/2017	MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Closed
EP	09767433.7	05/29/2009			EPITAXIAL LIFT OFF STACK HAVING A PRE-CURVED HANDLE AND METHODS THEREOF	Granted
EP	09820035.5	10/12/2009			EPITAXIAL LIFT OFF STACKS AND METHODS	Abandoned
HK	11113710.9	10/12/2009			MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
JP	2011-511866	05/29/2009			MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
KR	10-2010-7029634	05/29/2009	10-1550480	08/31/2015	EPITAXIAL LIFT OFF STACKS AND METHODS	Abandoned
KR	10-2011-7010493	10/12/2009			EPITAXIAL LIFT OFF STACKS AND METHODS	Granted
US	12/475406	05/29/2009	9,070,764 B2	06/30/2015	MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
US					EPITAXIAL LIFT OFF STACK HAVING A PRE-CURVED HANDLE AND METHODS THEREOF	Granted

US	12/475411	05/29/2009	8,309,432 B2	11/13/2012	EPITAXIAL LIFT OFF STACK HAVING A UNIVERSALLY SHRUNK HANDLE AND METHODS THEREOF	Granted
US	12/475415	05/29/2009	8,003,492 B2	08/23/2011	EPITAXIAL LIFT OFF STACK HAVING A UNIDIRECTIONALLY SHRUNK HANDLE AND METHODS THEREOF	Granted
US	12/475418	05/29/2009	8,314,011 B2	11/20/2012	EPITAXIAL LIFT OFF STACK HAVING A NON-UNIFORM HANDLE AND METHODS THEREOF	Granted
US	13/536043	06/28/2012	8,716,107 B2	05/06/2014	EPITAXIAL LIFT OFF STACK HAVING A NON-UNIFORM HANDLE AND METHODS THEREOF	Granted
US	12/475420	05/29/2009	8,367,518 B2	02/05/2013	EPITAXIAL LIFT OFF STACK HAVING A MULTILAYERED HANDLE AND METHODS THEREOF	Granted
US	12/577645	10/12/2009	9,064,810 B2	06/23/2015	MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Granted
PC	PCT/US2009/045715	05/29/2009			EPITAXIAL LIFT OFF STACKS AND METHODS	Expired
PC	PCT/US2009/060382	10/12/2009			MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Expired
US	61/057784	05/30/2008			EPITAXIAL LIFT OFF STACKS AND METHODS	Expired
US	61/104286	10/10/2008			EPITAXIAL LIFT OFF STACKS AND METHODS	Expired
US	61/104287	10/10/2008			MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Expired
TW	98118055	06/01/2009			EPITAXIAL LIFT OFF STACKS AND METHODS	Abandoned
TW	98134512	10/12/2009			MESA ETCH METHOD AND COMPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
US	13/772043	02/20/2013	1032603 B2	06/18/2019	PHOTOVOLTAIC DEVICE	Granted
CN	200980151541.1	10/23/2009			PHOTOVOLTAIC DEVICE	Abandoned
US	12/940861	11/05/2010	8,895,845 B2	11/25/2014	PHOTOVOLTAIC DEVICE	Granted
US	12/940876	11/05/2010	8,895,846 B2	11/25/2014	PHOTOVOLTAIC DEVICE	Granted
EP	09822792.9	10/23/2009			PHOTOVOLTAIC DEVICE	Abandoned
KR	10-2011-7011464	10/23/2009			PHOTOVOLTAIC DEVICE	Abandoned
US	12/605108	10/23/2009	8,937,244 B2	01/20/2015	PHOTOVOLTAIC DEVICE	Granted
PC	PCT/US2009/061898	10/23/2009			PHOTOVOLTAIC DEVICE	Expired
US	61/107954	10/23/2008			PHOTOVOLTAIC DEVICE	Expired
TW	98136003				PHOTOVOLTAIC DEVICE	Abandoned
CN	200980151499.3	10/23/2009			THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Published

US	12/940918	11/05/2010	8,669,467 B2	03/11/2014	THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Granted
US	12/940955	11/05/2010	8,912,432 B2	12/16/2014	PHOTOVOLTAIC DEVICE INCLUDING AN INTERMEDIATE LAYER	Granted
EP	09822796.0	10/23/2009			THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Closed
KR	10-2011-7011461	10/23/2009			THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Closed
US	12/605129	10/23/2009	8,674,214 B2	03/18/2014	THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Granted
PC	PCT/US2009/061906	10/23/2009			THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Expired
US	61/107959	10/23/2008			THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Expired
TW	098136006	10/23/2009			THIN ABSORBER LAYER OF A PHOTOVOLTAIC DEVICE	Abandoned
US	12/940966	11/05/2010	8,895,847 B2	11/25/2014	PHOTOVOLTAIC DEVICE WITH INCREASED LIGHT TRAPPING	Granted
US	12/605140	10/23/2009	8,686,284 B2	04/01/2014	PHOTOVOLTAIC DEVICE WITH INCREASED LIGHT TRAPPING	Granted
PC	PCT/US2009/061911	10/23/2009			PHOTOVOLTAIC DEVICE WITH INCREASED LIGHT TRAPPING	Expired
US	61/107962	10/23/2008			PHOTOVOLTAIC DEVICE WITH INCREASED LIGHT TRAPPING	Expired
TW	098136016				PHOTOVOLTAIC DEVICE WITH INCREASED LIGHT TRAPPING	Closed
US	14/706704	05/07/2015	10797187B2	10/06/2020	PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Granted
CN	200980151530.3	10/23/2009			PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Pending
EP	09822800.0	10/23/2009			PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Closed
KR	10-2011-7011463	10/23/2009			PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Abandoned
US	12/605151	10/23/2009	9,029,687 B2	05/12/2015	PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Granted
PC	PCT/US2009/061914	10/23/2009			PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Expired

US	61/107966	10/23/2008				PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Expired
TW	98135988					PHOTOVOLTAIC DEVICE WITH BACK SIDE CONTACTS	Closed
CN	200980150920.9	10/23/2009				INTEGRATION OF A PHOTOVOLTAIC DEVICE	Closed
EP	09822804.2	10/23/2009				INTEGRATION OF A PHOTOVOLTAIC DEVICE	Closed
KR	10-2011-7011462	10/23/2009				INTEGRATION OF A PHOTOVOLTAIC DEVICE	Closed
US	12/605163	10/23/2009	9,029,680 B2	05/12/2015		INTEGRATION OF A PHOTOVOLTAIC DEVICE	Granted
PC	PCT/US2009/061920	10/23/2009				INTEGRATION OF A PHOTOVOLTAIC DEVICE	Expired
US	61/107970	10/23/2008				INTEGRATION OF A PHOTOVOLTAIC DEVICE	Expired
TW	98135985					INTEGRATION OF A PHOTOVOLTAIC DEVICE	Closed
US	13/221780	08/30/2011				CHEMICAL VAPOR DEPOSITION REACTOR WITH ISOLATED SEQUENTIAL PROCESSING ZONES	Abandoned
EP	12182490.8	08/30/2012				CHEMICAL VAPOR DEPOSITION REACTOR WITH ISOLATED SEQUENTIAL PROCESSING ZONES	Closed
CN	200980149841.6	10/12/2009				CONTINUOUS FEED CHEMICAL VAPOR DEPOSITION	Abandoned
EP	09820031.4	10/12/2009				CONTINUOUS FEED CHEMICAL VAPOR DEPOSITION	Abandoned
KR	10-2011-7010499	10/12/2009				CONTINUOUS FEED CHEMICAL VAPOR DEPOSITION	Abandoned
US	12/577641	10/12/2009	8,008,174	08/30/2011		CONTINUOUS FEED CHEMICAL VAPOR DEPOSITION	Granted
PC	PCT/US2009/060372	10/12/2009				CONTINUOUS FEED CHEMICAL VAPOR DEPOSITION	Expired
TW	98134514	10/12/2009				CONTINUOUS FEED CHEMICAL VAPOR DEPOSITION	Abandoned
CA	2756857	03/01/2010	2756857	08/11/2015		TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Granted
CN	201080018652.8	03/01/2010	ZL201080018652.8	04/20/2016		TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Granted
EP	10746982.7	03/01/2010				TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Abandoned
JP	2011-552225	03/01/2010	5607081	09/05/2014		TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Granted



JP	2014-110180	03/01/2010	5963213	07/08/2016	TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Granted
KR	10-2011-7022442	03/01/2010			TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Abandoned
US	61/156404	02/27/2009			TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Expired
PC	PCT/US2010/025796	03/01/2010			TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Expired
US	12/715243	03/01/2010	8,362,592 B2	01/29/2013	TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Granted
TW	99105856	03/01/2010			TILED SUBSTRATES FOR DEPOSITION AND EPITAXIAL LIFT OFF PROCESSES	Abandoned
CN	200980155968.9	12/07/2009			MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF PROCESSES	Abandoned
EP	09836686.7	12/07/2009			MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
KR	10-2011-7015616	12/07/2009			MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
US	61/120687	12/08/2008			MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF	Expired
US	12/632565	12/07/2009	9,068,278 B2	06/30/2015	MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF	Granted
PC	PCT/US2009/067027	12/07/2009			MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF	Expired
TW	98141933	12/08/2009			MULTIPLE STACK DEPOSITION FOR EPITAXIAL LIFT OFF	Abandoned
CN	201080020505.4	03/16/2010	201080020505.4	05/13/2015	VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Granted
CN	201510196727.6	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Abandoned
EP	10754006.4	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Abandoned
JP	2012-500902	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Abandoned
KR	10-2011-7024339	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Abandoned
US	13/257264	12/12/2011			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Abandoned

PC	PCT/US2010/027538	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Expired
TW	99107659	03/16/2010			VAPOR DEPOSITION REACTOR SYSTEM AND METHODS THEREOF	Abandoned
CN	201080020492.0	03/16/2010	ZL201080020492.0	10/15/2014	WAFER CARRIER TRACK	Granted
EP	10754008.0	03/16/2010			WAFER CARRIER TRACK	Abandoned
JP	2012-500904	03/16/2010			WAFER CARRIER TRACK	Abandoned
KR	10-2011-7024341	03/16/2010			WAFER CARRIER TRACK	Abandoned
US	13/257269	12/12/2011	8,985,911 B2	03/24/2015	WAFER CARRIER TRACK	Granted
PC	PCT/US2010/027540	03/16/2010			WAFER CARRIER TRACK	Expired
TW	99107650	03/16/2010			WAFER CARRIER TRACK	Abandoned
CN	201080020750.5	03/16/2010	ZL 201080020750.5	08/31/2016	HEATING LAMP SYSTEM AND METHODS THEREOF	Granted
EP	10754010.6	03/16/2010			HEATING LAMP SYSTEM AND METHODS THEREOF	Abandoned
JP	2012-500905	03/16/2010			HEATING LAMP SYSTEM AND METHODS THEREOF	Abandoned
KR	10-2011-7024338	03/16/2010			HEATING LAMP SYSTEM AND METHODS THEREOF	Abandoned
US	13/257273	11/23/2011			HEATING LAMP SYSTEM AND METHODS THEREOF	Abandoned
PC	PCT/US2010/027542	03/16/2010			HEATING LAMP SYSTEM AND METHODS THEREOF	Expired
TW	99107644	03/16/2010			HEATING LAMP SYSTEM AND METHODS THEREOF	Abandoned
CN	201080021014.1	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
EP	10754013.0	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
JP	2012-500906	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
KR	10-2011-7024340	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
US	12/725326	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
PC	PCT/US2010/027545	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Expired
TW	99107657	03/16/2010			SHOWERHEAD FOR VAPOR DEPOSITION	Abandoned
CN	201080021046.1	03/16/2010	ZL201080021046.1	10/14/2015	REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Granted
EP	10754014.8	03/16/2010			REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Abandoned

JP	2012-500907	03/16/2010				REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Abandoned
KR	10-2011-7024337	03/16/2010		09/04/2013		REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Abandoned
US	13/257275	11/23/2011				REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Abandoned
PC	PCT/US2010/027547	03/16/2010				REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Expired
TW	99107646	03/16/2010				REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Abandoned
CN	200980155618.2	12/17/2009				TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Abandoned
EP	09836939.0	12/17/2009	2359393	05/29/2019		TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted
KR	10-2011-7016546	12/17/2009				TAP-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Abandoned
US	12/640796	12/17/2009	9,165,805	10/20/2015		TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted
PC	PCT/US2009/068445	12/17/2009				TAP-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Expired
US	61/138440	12/17/2008				EPITAXIAL LIFT OFF APPARATUS AND METHODS	Expired
US	61/257326	11/02/2009				TAPE-BASED EPITAXIAL LIFT OFF AND HANDLING METHODS AND APPARATUS	Expired
TW	98143360	12/17/2009				TAP-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Abandoned
CN	201080046469.9	10/14/2010	ZL201080046469.9	09/16/2015		TEXTURED METALLIC BACK REFLECTOR	Granted
JP	2012-534363	10/14/2010				TEXTURED METALLIC BACK REFLECTORS	Closed
KR	10-2012-7012346	10/14/2010	10-1719020	03/16/2017		TEXTURED METALLIC BACK REFLECTOR	Granted
US	12/904047	10/13/2010	9,691,921 B2	06/27/2017		TEXTURED METALLIC BACK REFLECTOR	Granted
PC	PCT/US2010/052706	10/14/2010				TEXTURED METALLIC BACK REFLECTORS	Expired
US	61/251681	10/14/2009				TEXTURED METALLIC BACK REFLECTORS	Expired
US	61/251684	10/14/2009				TEXTURED METAL-DIELECTRIC BACK REFLECTORS	Expired
TW	99135011					TEXTURED METALLIC BACK REFLECTORS	Closed
US	12/913688	10/27/2010	9,127,364 B2	09/08/2015		REACTOR CLEAN	Granted

PC	PCT/US2010/054548	10/28/2010				REACTOR CLEAN	Expired
CN	201110285628.7	09/23/2011	ZL201110285628.7	11/25/2015		MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Abandoned
EP	11182236.7	09/21/2011	2434552	11/05/2014		MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Granted
JP	2011-207152	09/22/2011				MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Pending
KR	10-2011-0096513	09/23/2011	10-1212868	12/10/2012		MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Granted
US	12/890368	09/24/2010				MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Abandoned
US	61/245907	09/25/2009				MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Expired
TW	100134183	09/22/2011				MIXED WIRING SCHEMES FOR SHADING ROBUSTNESS	Pending
PC	PCT/US2011/022296	01/24/2011				SUPPORT STRUCTURES FOR VARIOUS APPARATUSES INCLUDING OPTO-ELECTRICAL APPARATUSES	Expired
US	13/012741	01/24/2011				SUPPORT STRUCTURES FOR VARIOUS APPARATUSES INCLUDING OPTO-ELECTRICAL APPARATUSES	Abandoned
US	61/297692	01/22/2010				LAMINATED METALLIC SUPPORT FILMS FOR EPITAXIAL LIFT OFF STACKS	Expired
US	61/297702	01/22/2010				METHODS FOR FORMING EPITAXIAL LIFT OFF STACKS CONTAINING LAMINATED METALLIC SUPPORT FILMS	Expired
TW	100102541	01/24/2011				SUPPORT STRUCTURES FOR VARIOUS APPARATUSES INCLUDING OPTO-ELECTRICAL APPARATUSES	Abandoned
PC	PCT/US2011/022300	01/24/2011				SUPPORT STRUCTURES FOR VARIOUS APPARATUSES INCLUDING OPTO-ELECTRICAL APPARATUSES	Expired
CN	201180015400.4	01/24/2011				SUPPORT STRUCTURES FOR VARIOUS APPARATUSES INCLUDING OPTO-ELECTRICAL APPARATUSES	Abandoned
CA	2777544	10/14/2010				HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Abandoned
CN	201080046939.1	10/14/2010	ZL 201080046939.1	10/21/2015		HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Granted

EP	10824114.2	10/14/2010				HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Abandoned
US	61/251677	10/14/2009				HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Expired
US	12/904090	10/13/2010	9,834,860 B2	12/05/2017		METHOD OF HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Granted
PC	PCT/US2010/052714	10/14/2010				HIGH GROWTH DEPOSITION FOR GROUP III/IV MATERIALS	Expired
TW	99135012	10/14/2010				HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Abandoned
US	14/281386	05/19/2014	9,381,731 B2	07/05/2016		EPITAXIAL LIFT OFF SYSTEMS AND METHODS	Granted
US	13/039307	03/02/2011	10259206 B2	04/16/2019		EPITAXIAL LIFT OFF SYSTEMS AND METHODS	Granted
US	61/309625	03/02/2010				REDUCED ETCHANT CONSUMPTION METHODS AND APPARATUS FOR TAPE-BASED EPITAXIAL LIFT OFF	Expired
PC	PCT/US2011/026926	03/02/2011				EPITAXIAL LIFT OFF SYSTEMS AND METHODS	Expired
US	13/042379	03/07/2011	9,028,620 B2	05/12/2015		SUBSTRATE CLEAN SOLUTION FOR COPPER CONTAMINATION REMOVAL	Granted
US	61/311226	03/05/2010				SUBSTRATE CLEAN SOLUTION FOR COPPER CONTAMINATION REMOVAL	Expired
PC	PCT/US2011/027401	03/07/2011				SUBSTRATE CLEAN SOLUTION FOR COPPER CONTAMINATION REMOVAL	Expired
US						MODULES AND FABRICATION PROCESSES THEREOF	Abandoned
US						PHOTOVOLTAIC MODULE CONTAINING MONOLITHIC INTERCONNECTED PHOTOVOLTAIC TILES AND FABRICATION PROCESS THEREOF	Abandoned
US						PHOTOVOLTAIC MODULE CONTAINING RIBBON BOND PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Abandoned
CN	201380016212.2	02/01/2013				PHOTOVOLTAIC MODULE CONTAINING SHINGLED PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Abandoned
EP	13749204.7	02/01/2013				PHOTOVOLTAIC MODULE CONTAINING SHINGLED PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Published

HK	15105434.6	02/01/2013				PHOTOVOLTAIC MODULE CONTAINING SHINGLED PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Published
US	13/397487	02/15/2012	10741712 B2	08/11/2020		PHOTOVOLTAIC MODULE CONTAINING SHINGLED PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Granted
PC	PCT/US2013/024411	02/01/2013				PHOTOVOLTAIC MODULE CONTAINING SHINGLED PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Expired
US	13/222881	08/31/2011	9982346 B2	05/29/2018		MOVABLE LINER ASSEMBLY FOR A DEPOSITION ZONE IN A CVD REACTOR	Granted
EP	12182530.1	08/31/2012				MOVABLE LINER ASSEMBLY FOR A DEPOSITION ZONE IN A CVD REACTOR	Closed
US	13/222984	08/31/2011	9,644,268 B2	05/09/2017		THERMAL BRIDGE FOR CHEMICAL VAPOR DEPOSITION REACTORS	Granted
EP	12182540.0	08/31/2012				THERMAL BRIDGE FOR CHEMICAL VAPOR DEPOSITION REACTORS	Closed
US	14/924488	10/27/2015	10066297 B2	09/04/2018		TILED SHOWERHEAD FOR A SEMICONDUCTOR CHEMICAL VAPOR DEPOSITION REACTOR	Granted
CN	201510963868.6	12/21/2015	ZL201510963868.6	12/01/2020		TILED SHOWERHEAD FOR A SEMICONDUCTOR CHEMICAL VAPOR DEPOSITION REACTOR	Granted
US	13/222890	08/31/2011	9,175,393 B1	11/03/2015		TILED SHOWERHEAD FOR A SEMICONDUCTOR CHEMICAL VAPOR DEPOSITION REACTOR	Granted
US						CHAMBER WITHIN ENCLOSED SYSTEM (CHAMBER INSIDE CHAMBER)	Closed
CN	201110328908.1	10/26/2011				METALLIC CONTACTS FOR PHOTOVOLTAIC DEVICES AND LOW TEMPERATURE FABRICATION...	Pending
EP	11187679.3					METALLIC CONTACTS FOR PHOTOVOLTAIC DEVICES AND LOW TEMPERATURE FABRICATION...	Closed
JP	2011-226920	10/14/2011				METALLIC CONTACTS FOR PHOTOVOLTAIC DEVICES AND LOW TEMPERATURE FABRICATION...	Pending

KR	10-2011-0112781	11/01/2011	10-1380907	03/26/2014	METALLIC CONTACTS FOR PHOTOVOLTAIC DEVICES AND LOW TEMPERATURE FABRICATION...	Granted
US	12/939050	11/03/2010			METALLIC CONTACTS FOR PHOTOVOLTAIC DEVICES AND LOW TEMPERATURE FABRICATION...	Abandoned
TW	100136765				METALLIC CONTACTS FOR PHOTOVOLTAIC DEVICES AND LOW TEMPERATURE FABRICATION...	Closed
CN	201110329046.4	10/26/2011			OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Abandoned
US	13/451439	04/19/2012	9,178,099 B2	11/03/2015	METHODS FOR FORMING OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
US	13/451455	04/19/2012	9,136,418 B2	09/15/2015	OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION AND INTERMEDIATE LAYER	Granted
US	14/692647	04/21/2015	9,954,131 B2	04/24/2018	OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION AND INTERMEDIATE LAYER	Granted
EP	11187659.5	11/03/2011	2450956	09/04/2019	OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
JP	2011-226928	10/14/2011	5885238	02/19/2016	OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
KR	10-2011-0112785	11/01/2011			OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Published
US	12/939077	11/03/2010			OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Abandoned
TW	100139811				OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Abandoned
US	13/210138	08/15/2011	9,994,936 B2	06/12/2018	OFF-AXIS EPITAXIAL LIFT OFF PROCESS	Granted
CN	201210027952.3	02/09/2012	ZL 2012 1 0027952.3	03/01/2017	METHODS FOR GALLIUM ARSENIDE BASED PHOTOVOLTAIC DEVICES AND GALLIUM ARSENIDE BASED PHOTOVOLTAIC DEVICES	Granted
EP	12154739.2	02/09/2012	2487712	11/08/2017	SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted
GB	12154739.2	02/09/2012	2487712	11/08/2017	SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted

KR	10-2012-0013069	02/09/2012				SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Published
US	13/023733	02/09/2011	9,716,196 B2	07/25/2017		SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted
TW	101104046					SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Closed
US	13/023844	02/09/2011				METAL CONTACT FORMATION AND WINDOW ETCH STOP FOR PHOTOVOLTAIC DEVICES	Abandoned
CN	201210027953.8	02/09/2012				METAL CONTACT FORMATION AND WINDOW ETCH STOP FOR PHOTOVOLTAIC DEVICES	Abandoned
US	13/023925	02/09/2011				NON-ANNEALED METAL CONTACT TO SEMICONDUCTOR MATERIAL	Abandoned
CA	2,772,892	03/30/2012				SYSTEM AND METHOD FOR IMPROVED EPITAXIAL LIFT OFF	Abandoned
US	13/078722	04/01/2011	8,657,994	02/25/2014		SYSTEM AND METHOD FOR IMPROVED EPITAXIAL LIFT OFF	Abandoned
US	14/183349	02/18/2014	9,142,707	09/22/2015		SYSTEM AND METHOD FOR IMPROVED EPITAXIAL LIFT OFF	Granted
US						FLEXIBLE PHOTOVOLTAIC DEVICES ASSEMBLY IN A CYLINDRICAL CONFIGURATION	Closed
CN	201210085259.1	03/28/2012	ZL 201210085259.1	07/29/2015		FILM TRANSFER FRAME	Granted
CN	201510367965.9	03/28/2012	ZL201510367965.9	05/01/2018		FILM TRANSFER FRAME	Granted
EP	12161877.1	03/28/2012				FILM TRANSFER FRAME	Abandoned
US	13/077353	03/31/2011	8,403,315	03/26/2013		FILM TRANSFER FRAME	Granted
TW	101111442	03/30/2012				FILM TRANSFER FRAME	Abandoned
US	14/480147	09/08/2014	9,647,148 B2	05/09/2017		DEVICE FOR INDIVIDUAL FINGER ISOLATION IN AN OPTOELECTRONIC DEVICE	Granted
US	13/222310	08/31/2011	8,846,417	09/30/2014		DEVICE AND METHOD FOR INDIVIDUAL FINGER ISOLATION IN AN OPTOELECTRONIC DEVICE	Granted



TW	100140083	11/03/2011				DEVICE AND METHOD FOR INDIVIDUAL FINGER ISOLATION IN AN OPTOELECTRONIC DEVICE	Abandoned
US	13/223187	08/31/2011				PHOTON RECYCLING IN AN OPTOELECTRONIC DEVICE	Closed
US	61/493936	06/06/2011				PHOTON RECYCLING IN AN OPTOELECTRONIC DEVICE	Closed
TW	100143414	11/25/2011				PHOTON RECYCLING IN AN OPTOELECTRONIC DEVICE	Closed
US	13/222840	08/31/2011	9,212,422 B2	12/15/2015		CVD REACTOR WITH GAS FLOW VIRTUAL WALLS	Granted
EP	12182559.0	08/31/2012				CVD REACTOR WITH GAS FLOW VIRTUAL WALLS	Closed
US	13/223133	08/31/2011	8,728,933 B2	05/20/2014		LASER CUTTING AND CHEMICAL EDGE CLEAN FOR THIN-FILM SOLAR CELLS	Granted
US	13/222617	08/31/2011	8,399,281 B1	03/19/2013		TWO BEAM BACKSIDE LASER DICING OF SEMICONDUCTOR FILMS	Granted
US	13/222686	08/31/2011	8,728,849 B1	05/20/2014		LASER CUTTING THROUGH TWO DISSIMILAR MATERIALS SEPARATED BY A METAL FOIL	Granted
US	13/222750	08/31/2011	8,361,828 B1	01/29/2013		ALIGNED FRONTSIDE BACKSIDE LASER DICING OF SEMICONDUCTOR FILMS	Granted
US	13/223242	08/31/2011	9,130,093 B2	09/08/2015		METHOD AND APPARATUS FOR ASSEMBLING PHOTOVOLTAIC CELLS	Granted
US	13/222393	08/31/2011	9,698,284 B2	07/04/2017		INDIVIDUAL FINGER ISOLATION THROUGH SPOT APPLICATION OF A DIELECTRIC IN AN OPTOELECTRONIC DEVICE	Granted
TW	100140288	11/04/2011	1509825	11/21/2015		INDIVIDUAL FINGER ISOLATION THROUGH SPOT APPLICATION OF A DIELECTRIC IN AN OPTOELECTRONIC DEVICE AND FABRICATION METHOD	Granted
US	14/696106	04/24/2015	9,537,025	01/03/2017		TEXTURING A LAYER IN AN OPTOELECTRONIC DEVICE FOR IMPROVED ANGLE RANDOMIZATION OF LIGHT	Granted
US	14/452393	08/05/2014	9,502,594 B2	11/22/2016		THIN-FILM SEMICONDUCTOR OPTOELECTRONIC DEVICE WITH TEXTURED FRONT AND/OR BACK SURFACE PREPARED FROM TEMPLATE LAYER...	Granted

CN	201510475349.5	08/05/2015	ZL201510475349.5	05/11/2018	THIN-FILM SEMICONDUCTOR OPTOELECTRONIC DEVICE WITH TEXTURED FRONT AND/OR BACK SURFACE	Granted
US	13/354175	01/19/2012	9,136,422	09/15/2015	OPTOELECTRONIC DEVICE FOR IMPROVED ANGLE RANDOMIZATION OF LIGHT	Granted
US	13/420390	03/14/2012			DIFFUSERS WITH FRACTAL GAS PATHS IN THERMAL GRADIENT SHOWERHEADS	Abandoned
US	13/316343	12/09/2011			DIFFUSERS FOR MAKING THERMAL GRADIENT SHOWERHEADS IN A MOCVD REACTOR	Abandoned
US					OPTOELECTRONIC DEVICE WITH NON-CONTINUOUS BACK CONTACTS	Closed
US	13/446876	04/13/2012			OPTOELECTRONIC DEVICE WITH NON-CONTINUOUS BACK CONTACTS	Published
PC					OPTOELECTRONIC DEVICE WITH NON-CONTINUOUS BACK CONTACTS	Closed
US	13/420414	03/14/2012	9,114,464	08/25/2015	FIXTURE FOR SUBSTRATE CUTTING	Granted
US	13/434726	03/29/2012	9,950,404 B1	04/24/2018	HIGH THROUGHPUT POLISHING SYSTEM FOR WORKPIECES	Granted
US	13/790326	03/08/2013	9,337,014	05/10/2016	PROCESSING SYSTEM ARCHITECTURE WITH SINGLE LOAD LOCK CHAMBER	Granted
CN	201510400241.X	07/09/2015			SUBSTRATE PROCESSING USING INTERLEAVED LOAD LOCK TRANSFERS	Pending
US	14/669250	03/26/2015			SUBSTRATE PROCESSING USING INTERLEAVED LOAD LOCK TRANSFERS	Published
US	13/705064	12/04/2012	9,768,329 B1	09/19/2017	MULTI-JUNCTION OPTOELECTRONIC DEVICE	Granted
US	13/483779	05/30/2012	9,267,205	02/23/2016	FASTENER SYSTEM FOR SUPPORTING A LINER PLATE IN A GAS SHOWERHEAD REACTOR	Granted
US					JOINER STRUCTURE FOR SOLAR CELLS ARRAYS	Abandoned
US					FRAMES FOR THIN SEMICONDUCTOR FILMS TO ENABLE WAFER-LIKE HANDLING	Abandoned
CN	201510651165.X	10/10/2015			REFLECTOR AND SUSCEPTOR ASSEMBLY FOR CHEMICAL VAPOR DEPOSITION REACTOR	Pending
US	14/817037	08/03/2015	10932323	02/23/2021	REFLECTOR AND SUSCEPTOR ASSEMBLY FOR CHEMICAL VAPOR DEPOSITION REACTOR	Granted

US						METHOD OF MANUFACTURING FUSED QUARTZ THERMAL INSULATORS BY SPARK PLASMA SINTERING SPHERICAL SILICA	Closed
US	15/006003	01/25/2016				THIN FILM III-IV OPTOELECTRONIC DEVICE OPTIMIZED FOR NON-SOLAR ILLUMINATION SOURCES	Abandoned
US	62/108387					THIN FILM IN GAP OPTOELECTRONIC DEVICE	Expired
US						TRIPLE JUNCTION OPTOELECTRONIC DEVICE WITH GAAS AS THE BOTTOM ABSORBER	Closed
US	15/417105	01/26/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Published
US	62/289070	01/29/2016				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Expired
US	62/106636	01/22/2015				CORDESS SOLAR CHARGER	Expired
US	14/846675	09/04/2015				OPTOELECTRONIC DEVICE WITH DIELECTRIC LAYER AND METHOD OF MANUFACTURE	Published
CN	201510184183.1	04/17/2015	ZL 201510184183.1	06/04/2019		PERFORATION OF FILMS FOR SEPARATION	Granted
US	62/049227	09/11/2014				PERFORATION OF FILMS FOR SEPARATION	Expired
US	14/663683	03/20/2015	9,859,162	01/02/2018		PERFORATION OF FILMS FOR SEPARATION	Granted
US	62/184712	06/25/2015				PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Expired
US	14/918043	10/20/2015	10483410 B2	11/19/2019		FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Granted
US	14/858808	09/18/2015	9,711,671 B2	07/18/2017		VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted
US						MULTIFUNCTION OPTOELECTRONIC DEVICE BY LIFTOFF AND BONDING AND SECOND LIFTOFF	Closed
US						MULTIFUNCTION III-V/SI SOLAR CELL PRODUCED BY WAFER BONDING AND EPITAXIAL LIFT-OFF PROCESS	Closed
US	14/994889	01/13/2016	10693027 B2	06/23/2020		METHOD FOR INTERCONNECTING SOLAR CELLS	Granted

US	14/994961	01/13/2016			METHOD FOR SELECTIVELY COLORING METAL CONTACTS IN OPTOELECTRONIC DEVICE	Abandoned
US					A METHOD TO LAMINATE GAAS MODULE	Closed
US	62/264751	12/08/2015			VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS TO SIMPLY INTEGRATION INTO LOW-VOLTAGE ELECTRONIC	Expired
US	13/231111	09/13/2011			RESONANT LIGHT ABSORPTION IN SOLAR CELLS VIA WHISPERSING GALLERY NANO AND MICROSPHERES	Abandoned
US	61/382422	09/13/2010			RESONANT LIGHT ABSORPTION IN SOLAR CELLS VIA WHISPERSING GALLERY NANO AND MICROSPHERES	Expired
US	67/498282	06/17/2011			RESONANT LIGHT ABSORPTION IN SOLAR CELLS VIA WHISPERSING GALLERY NANO AND MICROSPHERES	Expired
PC	PCT/US2011/051384	09/13/2011			WHISPERSING GALLERY SOLAR CELLS	Expired
US	13/528721	06/20/2012	9,356,183	05/31/2016	OPTOELECTRONIC DEVICE WITH ENHANCED EFFICIENCY AND METHOD OF USE	Granted
US	61/499062				GAASSURFACE PASSIVATION USING SULFUR AND SELENIUM FUNCTIONALIZED SURFACTANTS	Expired
PC	PCT/US2016/014508	01/22/2016			CHARGING STATION FOR MOBILE DEVICE WITH SOLAR PANEL	Expired
PC	PCT/CN2018/093525	06/29/2018			METHOD AND SYSTEM FOR MOCVD EFFLUENT ABATEMENT	Expired
US	14/861821	09/22/2015	10204831 B2	02/12/2019	TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted
US	61/160690	03/16/2009			VAPOR DEPOSITION REACTOR SYSTEM	Expired
US	61/160696	03/16/2009			WAFER CARRIER TRACK	Expired
US	61/160703	03/16/2009			REACTOR LID ASSEMBLY FOR VAPOR DEPOSITION	Expired
US	61/160699	03/16/2009			HEATING LAMP SYSTEM	Expired
US	61/160700	03/16/2009			METHOD FOR HEATING WITH LAMPS	Expired

US	15/191375	06/23/2016				PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Published
PC	PCT/US2016/039417	06/24/2016				PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Expired
US	15/191410	06/23/2016	10076896 B2	09/18/2018		PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
US	61/160694	03/16/2009				MANUFACTURE AND METHOD OF USE	Expired
US	14/989659	01/06/2016	9,853,489	12/26/2017		CHARGING STATION FOR MOBILE DEVICE WITH SOLAR PANEL	Granted
PC	PCT/US2016/014866	01/26/2016				THIN FILM III-V OPTOELECTRONIC DEVICE OPTIMIZED FOR NON-SOLAR ILLUMINATION SOURCES	Expired
PC	PCT/US2016/039411	06/24/2016				PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Expired
CN	201610836332.2	10/26/2011	ZL 201610836332.2	06/11/2019		OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
US	15/340560	11/01/2016	10008628 B2	06/26/2018		THIN-FILM SEMICONDUCTOR OPTOELECTRONIC DEVICE WITH TEXTURED FRONT AND/OR BACK SURFACE PREPARED FROM TEMPLATE LAYER...	Granted
PC	PCT/US2016/052939	09/21/2016				OPTOELECTRONIC DEVICE WITH DIELECTRIC LAYER AND METHOD OF MANUFACTURE	Expired
PC	PCT/US2016/052127	09/16/2016				VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Expired
DE	11182236.7	09/21/2011	60 2011 011 059.4	11/05/2014		MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Granted
GB	11182236.7	09/21/2011	2434552	11/05/2014		MIXED WIRING SCHEME FOR SHADING ROBUSTNESS	Granted
PC	PCT/US2016/057752	10/19/2016				FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Expired
US	15/422218	02/01/2017				THIN-FILM SEMICONDUCTOR OPTOELECTRONIC DEVICE WITH TEXTURED FRONT AND/OR BACK SURFACE PREPARED FROM ETCHING	Allowed
US	15/372085	12/07/2016	10418933 B2	09/17/2019		VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS	Granted

PC	PCT/US2016/065612	12/08/2016				A VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS	Expired
US						PALLADIUM SEED AND LIGHT ASSISTED PLATING WITH ELECTROPLATING AND RESIST STRIP PROCESS OF THIN FILM GAAS SOLAR CELLS	Abandoned
PC	PCT/US2017/013230	01/12/2017				METHOD FOR INTERCONNECTING SOLAR CELLS	Expired
PC	PCT/US2017/013241	01/12/2017				METHOD FOR SELECTIVELY COLORING METAL CONTACTS IN OPTOELECTRONIC DEVICE	Expired
PC	PCT/US2017/015387	01/27/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Expired
CN	201710057541.1	01/26/2017	ZL201710057541.1	12/21/2018		METHODS FOR GALLIUM ARSENIDE BASED PHOTOVOLTAIC DEVICES AND GALLIUM ARSENIDE BASED PHOTOVOLTAIC DEVICES	Granted
US	15/693062	08/31/2017				SUPPORT STRUCTURES FOR VARIOUS APPARATUSES INCLUDING OPTO-ELECTRICAL APPARATUSES	Published
US	62/521241	06/16/2017				GROWTH SUBSTRATE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Expired
CN	201680006837.4	01/22/2016	ZL201680006837.4	06/02/2020		CHARGING STATION FOR MOBILE DEVICE WITH SOLAR PANEL	Granted
KR	10-2017-7023342	01/22/2016				CHARGING STATION FOR MOBILE DEVICE WITH SOLAR PANEL	Pending
US	15/656575	07/21/2017				SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Published
US	15/717694	09/27/2017				HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Published
JP	2017-538627	01/22/2016	6714005	06/08/2020		CHARGING STATION FOR MOBILE DEVICE WITH SOLAR PANEL	Granted
US	15/706090	09/15/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE	Allowed

EP	17198268.9	02/09/2012	3297026	01/06/2021	SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted
US	16/011516	06/18/2018	10586884 B2	03/10/2020	THIN-FILM, FLEXIBLE MULTI-JUNCTION OPTOELECTRONIC DEVICES INCORPORATING LATTICE-MATCHED DILUTE NITRIDE JUNCTIONS...	Granted
US	16/005289	06/11/2018			PLANARIZATION OF PHOTOVOLTAICS	Abandoned
CN	201680045097.5	06/24/2016			PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Published
EP	16745889.2	06/24/2016	3314639	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Granted
KR	2018-7002494	06/24/2016			PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Published
CN	201680044893.7	06/24/2016			PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Published
EP	16741433.3	06/24/2016	3314640	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
KR	2018-7002492	06/24/2016			PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Published
CN	201680054147.6	09/16/2016			VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Published
KR	10-2018-7010172	09/16/2016			VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Pending
JP	2018-512282	09/16/2016	6774086	10/06/2020	VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted
EP	16770656.3	09/16/2016	3350843	09/04/2019	VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted
EP	16787699.4	10/19/2016			FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Published
CN	201680061819.6	10/19/2016			FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Published
JP	2018-512422	10/19/2016			FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Pending

KR	10-2018-7014341	10/19/2016			FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Pending
US	15/809576	11/10/2017			CHARGING STATION FOR MOBILE DEVICE WITH SOLAR PANEL	Published
US	15/837533	12/11/2017	10615304 B2	04/07/2020	OPTOELECTRONIC DEVICE WITH DIELECTRIC LAYER AND METHOD OF MANUFACTURE	Granted
US	15/876001	01/19/2018	10337087 B2	07/02/2019	OFF-AXIS EPITAXIAL LIFT OFF PROCESS	Granted
US	15/934380	03/23/2018			PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Published
US	16/011531	06/18/2018	10797197B2	10/06/2020	THIN-FILM, FLEXIBLE OPTOELECTRONIC DEVICES INCORPORATING A SINGLE LATTICE-MATCHED DILUTE NITRIDE JUNCTION AND METHODS...	Granted
US	15/934409	03/23/2018			OFF-AXIS EPITAXIAL LIFT PROCESS	Abandoned
CN	201810340115.3	04/16/2018			THIN-FILM SEMICONDUCTOR OPTOELECTRONIC DEVICE WITH TEXTURED FRONT AND/OR BACK SURFACE PREPARED FROM TEMPLATE LAYER..	Published
US	15/953064	04/13/2018			HIGH THROUGHPUT POLISHING SYSTEM FOR WORKPIECES	Published
US	15/958844	04/20/2018	10916676 B2	02/09/2021	OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION AND INTERMEDIATE LAYER	Granted
CN	201680072342.1	12/08/2016			A VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS	Published
KR	10-2018-7019423	12/08/2016			A VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS	Pending
JP	2018-529132	12/08/2016			A VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS	Pending
EP	16820083.0	12/08/2016			A VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR CELLS	Published



US	15/957446	04/19/2018				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Published
US						PHOTOVOLTAGIC DEVICE INCLUDING SCHOTTKY JUNCTION BETWEEN III-V SEMICONDUCTOR AND TRANSPARENT CONDUCTOR	Closed
US	16/149893	10/02/2018				AUTOMATED LINEAR VACUUM DISTRIBUTION VALVE	Published
US	15/971571	05/04/2018	10718051 B2	07/21/2020		METHODS FOR CHEMICAL VAPOR DEPOSITION (CVD) IN A MOVABLE LINER ASSEMBLY	Granted
CN	201780008978.4	01/27/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Published
JP	2018-537648	01/27/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Pending
KR	10-2018-7024392	01/27/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Pending
EP	17703637.3	01/27/2017				MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP IV SEMICONDUCTOR AS A BOTTOM JUNCTION	Abandoned
CN	201780007438.4	01/12/2017				METHOD FOR INTERCONNECTING SOLAR CELLS	Published
EP	17702212.6	01/12/2017	3403283	10/30/2019		METHOD FOR INTERCONNECTING SOLAR CELLS	Granted
JP	2018-532251	01/12/2017				METHOD FOR INTERCONNECTING SOLAR CELLS	Pending
KR	10-2018-7023275	01/12/2017				METHOD FOR INTERCONNECTING SOLAR CELLS	Pending
US	16/008919	06/14/2018	10811557 B2	10/20/2020		GROWTH STRUCTURE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Granted
PC	PCT/US2018/037759	06/15/2018				GROWTH STRUCTURE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Expired

US					MULTIJUNCTION LED MANUFACTURED USING ELO PROCESS	Closed
US					MULTI-JUNCTION OPTOELECTRONIC DEVICE WITH GROUP III-IV-V SEMICONDUCTOR AS A JUNCTION	Closed
US	16/657765	10/18/2019			OPTOELECTRONIC DEVICES MANUFACTURED USING DIFFERENT GROWTH SUBSTRATES	Published
US	16/657802	10/18/2019	10873001 B2	12/22/2020	METHODS OF MANUFACTURING OPTOELECTRONIC DEVICES USING DIFFERENT GROWTH SUBSTRATES	Granted
US					DIFFUSER FOR MAKING THERMAL GRADIENT SHOWERHEADS IN A MOCVD REACTOR	Closed
PC	PCT/US2018/049869	09/07/2018			HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Expired
US	63/071266	08/27/2020			FIXTURE DESIGN FOR EPITAXIAL LIFT-OFF SYSTEMS WITH HIGH ETCH SELECTIVITY	Pending
US	63/071757	08/28/2020			A SOLAR ENERGY ABSORBING DEVICE AND MODULE IMPLEMENTING METALLIC COPPER GRID LINES WITH A BLACK COATING ON ITS SURFACE	Pending
CN	201810806187.2	07/20/2018			A WAFER SEPARATION DEVICE AND SEPARATION METHOD	Pending
CN	201821155549.8	07/20/2018			A WAFER SEPARATION DEVICE AND SEPARATION METHOD	Pending
CN	201810813474.6	07/23/2018			A DEVICE AND METHOD OF LIFTING AND HOLDING WET EQUIPMENT	Pending
CN	201821168128.9	07/23/2018			A DEVICE AND METHOD OF LIFTING AND HOLDING WET EQUIPMENT	Pending
US	63/071246	08/27/2020			WAFER BASE FOR HIGH SPEED EPITAXIAL LIFTOFF PROCESS	Pending
US	16/264324	04/31/2019			ENERGY DEVICE FOR USE IN ELECTRONIC DEVICES	Published
US	16/399012	04/30/2019			SPUTTERED THEN EVAPORATED BACK METAL PROCESS FOR INCREASED THROUGHPUT	Published
US	62/746971	10/17/2018			HARVESTABLE INDOOR ENERGY METER	Expired
US	16/194029	11/16/2018			OPTOELECTRONIC DEVICE WITH NON-CONTINUOUS BACK CONTACTS	Published

US	16/198124	11/21/2018				OPTOELECTRONIC DEVICE WITH NON-CONTINUOUS BACK CONTACTS	Published
US	16/257569	01/25/2019				SYSTEMS AND METHODS FOR SHINGLING CELLS USING AN ADHESIVE FILM	Published
US	63/071173	08/27/2020				BIFACIAL OPTOELECTRONIC DEVICE WITH TRANSPARENT CONDUCTIVE LAYER	Pending
US	16/277749	02/15/2019				SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Published
US	16/460432	07/02/2019				SYSTEMS AND METHODS FOR MEASURING ELECTRICAL CHARACTERISTICS OF A MATERIAL USING A NON-DESTRUCTIVE MULTI-POINT PROBE	Published
US	16/198139	11/21/2018				OPTOELECTRONIC DEVICE WITH NON-CONTINUOUS BACK CONTACTS	Abandoned
US	16/373305	04/02/2019				LASER-TEXTURED THIN-FILM SEMICONDUCTORS BY MELTING AND ABLATION	Published
US	16/370473	03/29/2019				FRONT METAL CONTACT STACK	Published
US	63/071747	08/28/2020				SYSTEMS AND METHODS FOR SUPPLYING AN ETCHANT IN A GASEOUS STATE DURING EPITAXIAL LIFT-OFF PROCESSING	Pending
US	63/071829	08/28/2020				METHOD AND APPARATUS FOR EPITAXIAL LIFT-OFF USING SMALL ETCHANT VOLUMES	Pending
US						TRIMETHYLINDIUM VAPOR STATION DESIGN	Closed
US	16/405347	05/07/2019				METHODS AND SYSTEMS FOR CLEANING DEPOSITION SYSTEMS	Published
US	63/076582	09/10/2020				SYSTEMS AND METHODS FOR HIGH-RATE ELECTROCHEMICAL ARSINE GENERATION	Pending
US	16/427142	05/30/2019				FORMING FRONT METAL CONTACT ON SOLAR CELL WITH ENHANCED RESISTANCE TO STRESS	Published
CN	201910548576.4	06/24/2019				PHOTOVOLTAIC MODULE CONTAINING SHINGLED PHOTOVOLTAIC TILES AND FABRICATION PROCESSES THEREOF	Published
US	62/815185	03/07/2019				METHODS AND SYSTEMS FOR ALIGNMENT TO EMBEDDED PATTERNS IN SEMICONDUCTOR DEVICE PROCESSING	Expired

PC	PCT/US2019/022979	03/19/2019			PLANARIZATION OF PHOTOVOLTAICS	Expired
US	63/083417	09/25/2020			METHODS AND SYSTEMS FOR REDUCING DEFECTS	Pending
US	16/657271	10/18/2019			METHODS AND SYSTEMS FOR IDENTIFYING FEATURES	Pending
US	63/071837	08/28/2020			INFRARED IMAGING OF SEMICONDUCTOR FILM	Closed
US					LOW TEMPERATURE METALLIC INTERCONNECT FOR SOLAR CELL SHINGLING	Pending
PC	PCT/US2019/023607	03/22/2019			THIN-FILM, FLEXIBLE OPTOELECTRONIC DEVICES INCORPORATING A SINGLE LATTICE-MATCHED DILUTE NITRIDE JUNCTION AND METHODS...	Expired
PC	PCT/US2019/023601	03/22/2019			THIN-FILM, FLEXIBLE MULTI-JUNCTION OPTOELECTRONIC DEVICES INCORPORATING LATTICE-MATCHED DILUTE NITRIDE JUNCTIONS...	Expired
US					LAMINATED FIXTURE - SPRINGBOARD CONCEPT	Closed
US	63/078011	09/14/2020			PHOTOVOLTAIC DEVICES INCLUDING FLEXIBLE BYPASS DIODE CIRCUIT	Pending
US	63/079595	09/17/2020			REPLACEABLE SOLAR MODULE FOR AUTOMOTIVE USE	Pending
US	63/083250	09/25/2020			COLOR-CODED PATTERNS FOR EPITAXIAL LIFT-OFF (ELO) FILMS BACKGROUND	Pending
US					USE OF MOLYBDENUM AS A BACK METAL IN GAAS BASED PV DEVICES	Closed
US	16/595939	10/08/2019			GAS TRAP SYSTEM HAVING A CONICAL INLET CONDENSATION REGION	Pending
US					THERMALLY CONDUCTIVE SOLAR CELL BONDING	Closed
US					THERMOCOUPLE SPOOL WINDER	Closed
US	16/404602	05/06/2019	10505058 B2	12/10/2019	PHOTOVOLTAIC DEVICE	Granted
EP	19185026.2	11/03/2011			OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Published
EP	19176222.8	06/24/2016	3547354	12/30/2020	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted

EP	19176210.3	06/24/2016	3550597	01/20/2021	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS SURFACE PASSIVATION OF III-V OPTOELECTRONIC DEVICES	Granted
US	62/847766	05/14/2019			SURFACE PASSIVATION OF III-V OPTOELECTRONIC DEVICES	Expired
US	16/592124	10/03/2019			MODULES INCORPORATING ENCAPSULATION LAYERS	Pending
US	16/412328	05/14/2019			HIGH GROWTH RATE DEPOSITION FOR GROUP III/IV MATERIALS	Published
US	63/076615	09/10/2020			SYSTEMS AND METHODS FOR LARGE SCALE GAS GENERATION	Pending
US					EXTERNAL STRESS ASSISTED EPITAXIAL LIFT-OFF METHOD OF THIN PHOTOVOLTAICS	Unfiled
US	17/256577	12/28/2020			METHOD AND SYSTEM FOR MOCVD EFFLUENT ABATEMENT	Pending
EP	18924020.3	06/29/2018			METHOD AND SYSTEM FOR MOCVD EFFLUENT ABATEMENT	Pending
CN	201880010674.6	06/29/2018			METHOD AND SYSTEM FOR MOCVD EFFLUENT ABATEMENT	Published
TW	108122881	06/28/2019			METHOD AND SYSTEM FOR MOCVD EFFLUENT ABATEMENT	Pending
KR	10-2019-7020017	06/29/2018			METHOD AND SYSTEM FOR MOCVD EFFLUENT ABATEMENT	Pending
JP	2019-552625	06/29/2018			METHOD AND SYSTEM FOR EFFLUENT ABATEMENT	Pending
EP		03/22/2019			THIN-FILM, FLEXIBLE OPTOELECTRONIC DEVICES INCORPORATING A SINGLE LATTICE MATCHED DILUTE NITRIDE JUNCTION AND METHODS...	Closed
CN	201980001932.9	03/22/2019			THIN-FILM, FLEXIBLE OPTOELECTRONIC DEVICES INCORPORATING A SINGLE LATTICE MATCHED DILUTE NITRIDE JUNCTION AND METHODS...	Published

KR	10-2019-7024287	03/22/2019				THIN-FILM, FLEXIBLE OPTOELECTRONIC DEVICES INCORPORATING A SINGLE LATTICE-MATCHED DILUTE NITRIDE JUNCTION AND METHODS...	Pending
JP	2019-548307	03/22/2019				THIN-FILM, FLEXIBLE OPTOELECTRONIC DEVICES INCORPORATING A SINGLE LATTICE-MATCHED DILUTE NITRIDE JUNCTION AND METHODS...	Pending
EP		03/22/2019				THIN-FILM, FLEXIBLE MULTI-JUNCTION OPTOELECTRONIC DEVICES INCORPORATING LATTICE-MATCHED DILUTE NITRIDE JUNCTIONS...	Closed
CN	201980001919.3	03/22/2019				THIN-FILM, FLEXIBLE MULTI-JUNCTION OPTOELECTRONIC DEVICES INCORPORATING LATTICE-MATCHED DILUTE NITRIDE JUNCTIONS...	Published
KR	10-2019-7031712	03/22/2019				THIN-FILM, FLEXIBLE MULTI-JUNCTION OPTOELECTRONIC DEVICES INCORPORATING LATTICE-MATCHED DILUTE NITRIDE JUNCTIONS...	Pending
JP	2019-551316	03/22/2019				THIN-FILM, FLEXIBLE MULTI-JUNCTION OPTOELECTRONIC DEVICES INCORPORATING LATTICE-MATCHED DILUTE NITRIDE JUNCTIONS...	Pending
US	16/570882	09/13/2019				VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR CONNECTING TWO FLEXIBLE SOLAR CELLS	Published
US	16/570927	09/13/2019				VERSATILE FLEXIBLE CIRCUIT INTERCONNECTION FOR FLEXIBLE SOLAR MODULES	Published
US						HARVESTABLE INDOOR ENERGY METER	Unfiled
BE	09836939.0	12/17/2009	2359393	05/29/2019		TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted
DE	09836939.0	12/17/2009	60 2009 058 579.7	05/29/2019		TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted
NL	09836939.0	12/17/2009	2359393	05/29/2019		TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted
GB	09836939.0	12/17/2009	2359393	05/29/2019		TAPE-BASED EPITAXIAL LIFT OFF APPARATUSES AND METHODS	Granted

BE	16741433.3	06/24/2016	3314640	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
FR	16741433.3	06/24/2016	3314640	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
DE	16741433.3	06/24/2016	60 2016 017 395.6	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
NL	16741433.3	06/24/2016	3314640	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
GB	16741433.3	06/24/2016	3314640	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE AND METHOD OF USE	Granted
BE	16745889.2	06/24/2016	3314639	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Granted
FR	16745889.2	06/24/2016	3314639	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Granted
DE	16745889.2	06/24/2016	60 2016 017 405.7	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Granted
NL	16745889.2	06/24/2016	3314639	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Granted
GB	16745889.2	06/24/2016	3314639	07/24/2019	PRESSURIZED HEATED ROLLING PRESS FOR MANUFACTURE OF PHOTOVOLTAIC CELLS	Granted
CN	201880024678.X	09/07/2018			HIGH GROWTH RATE DEPOSITION FOR GROUP III/V MATERIALS	Published
KR	10-2019-7022544	09/07/2018			HIGH GROWTH RATE DEPOSITION FOR GROUP III/V MATERIALS	Pending
JP	2019-541292	09/07/2018			HIGH GROWTH RATE DEPOSITION FOR GROUP III/V MATERIALS	Pending
EP	18779506.7	09/07/2018			HIGH GROWTH RATE DEPOSITION FOR GROUP III/V MATERIALS	Published
PC	PCT/US2019/044122	07/30/2019			HARVESTABLE INDOOR ENERGY METER	Published
PC	PCT/US2019/044131	07/30/2019			AUTOMATED LINEAR VACUUM DISTRIBUTION VALVE	Published
DE	16770656.3	09/16/2016	602016020042.2	09/04/2019	VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted
GB	16770656.3	09/16/2016	3350843	09/04/2019	VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted
NL	16770656.3	09/16/2016	3350843	09/04/2019	VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted
BE	16770656.3	09/16/2016	3350843	09/04/2019	VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Granted

CN	20188003436.7	06/15/2018				GROWTH STRUCTURE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Published
KR	10-2019-7035002	06/15/2018				GROWTH STRUCTURE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Pending
JP	2019-563844	06/15/2018				GROWTH STRUCTURE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Pending
EP	18738110.8	06/15/2018				GROWTH STRUCTURE UNDER A RELEASE LAYER FOR MANUFACTURING OF OPTOELECTRONIC DEVICES	Abandoned
US	16/585436	09/27/2019				PLANARIZATION OF PHOTOVOLTAICS	Published
US	17/063357	10/05/2020				PHOTOVOLTAIC PROTECTION	Published
GB	11187659.5	11/03/2011	2450956	09/04/2019		OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
FR	11187659.5	11/03/2011	2450956	09/04/2019		OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
BE	11187659.5	11/03/2011	2450956	09/04/2019		OPTOELECTRONIC DEVICES INCLUDING HETEROJUNCTION	Granted
FR	17702212.6	01/12/2017	3403283	10/30/2019		METHOD FOR INTERCONNECTING SOLAR CELLS	Granted
GB	17702212.6	01/12/2017	3403283	10/30/2019		METHOD FOR INTERCONNECTING SOLAR CELLS	Granted
BE	17702212.6	01/12/2017	3403283	10/30/2019		METHOD FOR INTERCONNECTING SOLAR CELLS METHOD FOR INTERCONNECTING SOLAR CELLS	Granted
NL	17702212.6	01/12/2017	3403283	10/30/2019		METHOD FOR INTERCONNECTING SOLAR CELLS	Granted
PC	PCT/US2020/016029	01/31/2020				AN ENERGY DEVICE FOR USE IN ELECTRONIC DEVICES	Published
PC	PCT/US2020/014907	01/24/2020				SYSTEMS AND METHODS FOR SHINGLING CELLS USING AN ADHESIVE FILM	Published
PC	PCT/US2020/018028	02/13/2020				SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Published



US	16/809911	03/05/2020				METHODS AND SYSTEMS FOR ALIGNMENT TO EMBEDDED PATTERNS IN SEMICONDUCTOR DEVICE PROCESSING	Published
PC	PCT/US2020/021356	03/06/2020				METHOD AND SYSTEMS FOR ALIGNMENT TO EMBEDDED PATTERNS IN SEMICONDUCTOR DEVICE PROCESSING	Published
PC	PCT/US2020/023501	03/19/2020				FRONT METAL CONTACT STACK	Published
PC	PCT/US2020/023510	03/19/2020				LASER-TEXTURED THIN-FILM SEMICONDUCTORS BY MELTING AND ABLATION	Published
PC	PCT/US2020/030683	04/30/2020				SPUTTERED THEN EVAPORATED BACK METAL PROCESS FOR INCREASED THROUGHPUT	Published
PC	PCT/US2020/030764	04/30/2020				METHODS AND SYSTEMS FOR CLEANING DEPOSITION SYSTEMS	Published
PC	PCT/US2020/032676	05/13/2020				HIGH GROWTH RATE DEPOSITION FOR GROUP III/V MATERIALS	Published
PC	PCT/US2020/032854	05/14/2020				SURFACE PASSIVATION OF III-V OPTOELECTRONIC DEVICES	Published
US	15/931513	05/13/2020				SURFACE PASSIVATION OF III-V OPTOELECTRONIC DEVICES	Published
US						VIA STRUCTURES FOR SOLAR CELL INTERCONNECTION IN SOLAR MODULE	Closed
BE	12154739.2	02/09/2012	2487712	11/08/2017		SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted
DE	12154739.2	02/09/2012	60 2012 039 408.0	11/08/2017		SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted
NL	12154739.2	02/09/2012	2487712	11/08/2017		SELF-BYPASS DIODE FUNCTION FOR GALLIUM ARSENIDE PHOTOVOLTAIC DEVICES	Granted
US						METAL CONTACT FORMATION AND WINDOW ETCH STOP FOR PHOTOVOLTAIC DEVICES	Closed
US						NON-ANNEALED METAL CONTACT TO SEMICONDUCTOR MATERIAL	Closed

PC	PCT/US2020/040781	07/02/2020			SYSTEMS AND METHODS FOR MEASURING ELECTRICAL CHARACTERISTICS OF A MATERIAL USING A NON-DESTRUCTIVE MULTI-POINT PROBE	Published
PC	PCT/US2020/056101	10/16/2020			OPTOELECTRONIC DEVICES MANUFACTURED USING DIFFERENT GROWTH SUBSTRATES	Pending
PC	PCT/US2020/056122	10/16/2020			METHODS OF MANUFACTURING OPTOELECTRONIC DEVICES USING DIFFERENT GROWTH SUBSTRATES	Pending
PC	PCT/US2020/055624	10/14/2020			METHODS AND SYSTEMS FOR IDENTIFYING FEATURES	Pending
PC	PCT/US2020/054591	10/07/2020			GAS TRAP SYSTEM HAVING A CONICAL INLET CONDENSATION REGION	Pending
PC	PCT/US2020/054010	10/02/2020			MODULES INCORPORATING ENCAPSULATION LAYERS	Pending

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