

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT5821180

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
	Name	Execution Date
	AVANTIUM HOLDING B.V.	01/12/2017
RECEIVING PARTY DATA		
Name:	AVANTIUM KNOWLEDGE CENTRE B.V.	
Street Address:	ZEKERINGSTRAAT 29	
City:	AMSTERDAM	
State/Country:	NETHERLANDS	
Postal Code:	1014 BV	
PROPERTY NUMBERS Total: 1		
	Property Type	Number
	Application Number:	16400565
CORRESPONDENCE DATA		
Fax Number:	(402)496-0333	
<i>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.</i>		
Phone:	4024960300	
Email:	file@suiter.com	
Correspondent Name:	AVANTIUM SUITER SWANTZ PC LLO	
Address Line 1:	14301 FNB PARKWAY	
Address Line 2:	SUITE 220	
Address Line 4:	OMAHA, NEBRASKA 68154	
ATTORNEY DOCKET NUMBER:	LL 0052AD1	
NAME OF SUBMITTER:	CHAD W. SWANTZ	
SIGNATURE:	/chad w swantz/	
DATE SIGNED:	11/14/2019	
Total Attachments: 22		
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IP ASSIGNMENT AGREEMENT

This IP assignment agreement (the "AVTH-AKC IP Assignment Agreement") is made between

AVANTIUM HOLDING B.V., a limited liability company with its registered office at Zekeringstraat 29, 1014 BV, Amsterdam, The Netherlands
("AVTH")

and

AVANTIUM KNOWLEDGE CENTRE B.V., a limited liability company with its registered office at Zekeringstraat 29, 1014 BV, Amsterdam, The Netherlands
("AKC")

RECITALS

- A. The Parties (as defined below) are both party to the Intellectual Property Rights Handling Agreement (as defined below).
- B. Pursuant to the Intellectual Property Rights Handling Agreement, AVTH may designate, inter alia, the right to apply for patents and the right to such patent applications and patents, to another party to the Intellectual Property Rights Handling Agreement.
- C. AVTH has entered into the Ares-Avantium IP Assignment Agreement (as defined below) with Ares (as defined below).
- D. Pursuant to the Ares-Avantium IP Assignment Agreement, Ares has assigned and AVTH has accepted, all right, title and interest in and to the Assigned Intellectual Property Rights (as defined below).
- E. AVTH now wishes to assign the Assigned Intellectual Property Rights to AKC, and AKC wishes to accept such assignment on the terms and conditions set out in this AVTH-AKC IP Assignment Agreement.

NOW THEREFORE IT IS AGREED AS FOLLOWS:

1. DEFINITIONS

Capitalized terms in this AVTH-AKC IP Assignment Agreement shall have the meaning as defined below:

- 1.1 "Ares" means Ares Capital Corporation, a Maryland corporation with its registered office at 245 Park Avenue, 44th Floor, New York, NY 10167, United States of America.
- 1.2 "Ares-Avantium IP Assignment Agreement" means the IP assignment agreement between Ares and AVTH with an effective date of 20 December, 2016.
- 1.3 "Assigned Intellectual Property Rights" means all intellectual property rights assigned by Ares to AVTH pursuant to the Ares-Avantium IP Assignment Agreement, including, but not limited to: (i) the Patent Rights listed in Annex A to this AVTH-AKC IP Assignment Agreement, with a legal status as applicable on the Effective Date and owned, as applicable solely or jointly, by AVTH; and (ii) the Know-How listed in Annex B to this AVTH-AKC IP Assignment Agreement.
- 1.4 "Effective Date" means the date of signing this AVTH-AKC IP Assignment Agreement by the later Party to sign.

- 1.5 "Intellectual Property Rights Handling Agreement" means the intellectual property rights handling agreement between, inter alia, AVTH and AKC with an effective date of 1 January 2014.
- 1.6 "Know-How" means all trade secrets, know-how, proprietary processes, formulae, algorithms, models, and/or methodologies and any copyright, copyrightable subject matter and database rights included therein.
- 1.7 "Party" means AVTH or AKC, as the context so requires, and "Parties" shall mean AVTH and AKC collectively.
- 1.8 "Patent Rights" means all patents, invention registrations, invention disclosures and patent applications comprised in Annex A, including, but not limited to, all divisionals, provisionals, non-provisionals, continuations, continuations-in-part, renewals, supplementary protection certificates, extensions, reissues and reexaminations thereof, and all patents that may issue on such applications in any patent office in any country in the world.

2. ASSIGNMENT

- 2.1 With effect from the Effective Date, pursuant to and for good and valuable consideration as set out in the Intellectual Property Rights Handling Agreement, receipt of which consideration AVTH herewith expressly acknowledges, AVTH hereby assigns and AKC hereby accepts, all rights, title and interest in and to the Assigned Intellectual Property Rights.
For the avoidance of doubt, Parties acknowledge and agree that these Assigned Intellectual Property Rights include, but are not limited to:
- a) All rights and entitlement to all patents granted pursuant to any of the patent applications comprised in the Assigned Intellectual Property Rights; and
 - b) All rights to claim priority from and/or with respect to any of the Assigned Intellectual Property Rights; and
 - c) All rights and entitlement to sue for past, present and future infringement, misappropriation, dilution or other violation of any of the Assigned Intellectual Property Rights, or any other cause of action arising from ownership, and all remedies at law or equity associated therewith; and
 - d) All rights and entitlement to file patent applications for any of the inventions incorporated within the Know-How.
- 2.2 With effect from the Effective Date, AVTH waives the right to assert any moral rights associated with Assigned Intellectual Property Rights.
- 2.3 The right and responsibility for the further filing, prosecution, issuance, maintenance, defense and enforcement of the Patent Rights shall pass from AVTH to AKC on the Effective Date.
- 2.4 For the avoidance of doubt, AKC hereby grants to AVTH and any other party to the Intellectual Property Rights Handling Agreement a royalty-free license under the Patent Rights and under the rights it holds to the Know-How for use in connection with AVTH's and each such other party's business activities in their respective fields of interest at the time in question, subject to the terms and conditions as agreed between such parties in the Intellectual Property Rights Handling Agreement.

3. RECORDATION

3.1 AVTH hereby:

- a) authorizes and requests all relevant patent offices and any corresponding official of any country whose duty it is to register patents and/or patent applications, of any country in which the Patent Rights are filed: (i) to register all Patent Rights in the name of AKC or, as the case may be, any successor or nominee of AKC; and (ii) to record AKC as the assignee and owner of such Patent Rights; and
- b) appoints AKC or its nominee to be its attorney and in its name and on its behalf execute any documents and do all other things as may be necessary or desirable to give full effect to the terms of this AVTH-AKC IP Assignment Agreement.

4. MISCELLANEOUS

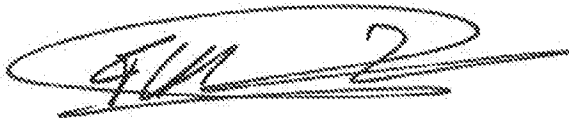
- 4.1 This AVTH-AKC IP Assignment Agreement, and the relationship between AVTH and AKC under this Agreement, shall in all respects be interpreted in accordance with and governed by the laws of the Netherlands.
- 4.2 Any dispute between the Parties arising out of or in connection with this AVTH-AKC IP Assignment Agreement, whether in contract, tort (including negligence) or otherwise, shall be exclusively and finally settled by arbitration in Amsterdam, the Netherlands, by three arbitrators in accordance with the Rules of the Netherlands Arbitration Institute.
- 4.3 This AVTH-AKC IP Assignment Agreement may be executed in any number of counterparts, each of which when executed and delivered shall be an original, but all such counterparts shall constitute one and the same instrument. The exchange of executed copies of this AVTH-AKC IP Assignment Agreement by facsimile, portable document format (PDF) or other reasonable form of electronic transmission shall constitute effective execution and delivery of this AVTH-AKC IP Assignment Agreement.

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IN WITNESS WHEREOF, the parties hereto have executed this AVTH-AKC IP Assignment Agreement or caused this AVTH-AKC IP Assignment Agreement to be executed on their behalf by a duly authorized officer as of the date first set forth above.

AVTH:
AVANTIUM HOLDING B.V.

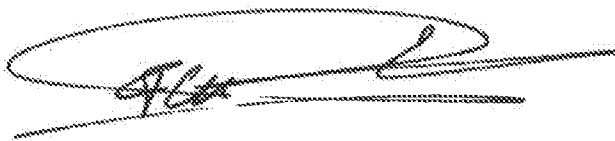
Represented by:



Name: FLM Roerink
Title: CFO, 12/1/2017

AKC:
AVANTIUM KNOWLEDGE CENTRE B.V.

Avantium Holding B.V., in its turn represented by:



Name: FLM Roerink
Title: CFO, 12/1/2017

Execution Version

Annex A: Patent Rights

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0001	US	12/846,221	29-Jul-2010			Reducing Carbon Dioxide to Products
LL 0001 AU	Australia	2011282767	29-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 BR	Brazil	1120130022213	29-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 CA	Canada	2,805,840	16-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 CN	China	201180036854.x	28-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 EP	EPO	11813101	30-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 IN	India	239/KOLNP/2013	28-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 JP	Japan	2013-521930	28-Jan-2013			Reducing Carbon Dioxide to Products
LL 0001 KR	Korea	2013-7005179	28-Feb-2013			Reducing Carbon Dioxide to Products
LL 0001 PCT	PCT	PCT/US11/45515	27-Jul-2011			Reducing Carbon Dioxide to Products
LL 0003	US	12/846,011	29-Jul-2010	8,845,877	30-Sep-2014	Heterocycle Catalyzed Electrochemical Process
LL 0003 PCT	PCT	PCT/US11/45521	27-Jul-2011			Heterocycle Catalyzed Electrochemical Process
LL 0003 AU	Australia	2011282771	29-Jan-2013	2011282771	25-Jun-2015	Heterocycle Catalyzed Electrochemical Process
LL 0003 BR	Brazil	1120130022310	29-Jan-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 CA	Canada	2,805,843	16-Jan-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 CN	China	201180036868.1	28-Jan-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 D	US	14/488,848	17-Sep-2014			Heterocycle Catalyzed Electrochemical Process
LL 0003 EP	EPO	11813103.6	30-Jan-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 IN	India	238/KOLNP/2013	28-Jan-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 JP	Japan	2013-521933	28-Jan-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 KR	Korea	2013-7005183	28-Feb-2013			Heterocycle Catalyzed Electrochemical Process
LL 0003 PR1	US	61/315,710	19-Mar-2010			Heterocycle Catalyzed Electrochemical Process
LL 0003 PR2	US	61/315,564	19-Mar-2010			Heterocycle Catalyzed Electrochemical Process
LL 0004	US	12/846,002	29-Jul-2010	8,721,866	13-May-2014	Electrochemical Production of Synthesis Gas from Carbon Dioxide

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0004 AU	Australia	2011282783	29-Jan-2013	2011282783	20-Aug-2015	Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 BR	Brazil	112013002218	29-Jan-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 CA	Canada	2,805,852	16-Jan-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 CN	China	201180036852.0	28-Jan-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 EP	EPO	11813111.9	30-Jan-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 IN	India	237/KOLNP/2013	28-Jan-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 JP	Japan	2013-521939	28-Jan-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 KR	Korea	2013-7005184	28-Feb-2013			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004 PCT	PCT	PCT/US11/45534	27-Jul-2011			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004A AU	Australia	2015202166	25-Apr-2015			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0004D1	US	14/253,964	16-Apr-2014			Electrochemical Production of Synthesis Gas from Carbon Dioxide
LL 0005	US	12/845,995	29-Jul-2010	8,500,987	6-Aug-2013	Purification of Carbon Dioxide from a Mixture of Gases
LL 0005D1	US	13/923,940	21-Jun-2013	9,222,179	29-Dec-2015	Purification of Carbon Dioxide from a Mixture of Gases
LL 0006	US	12/875,227	3-Sep-2010	8,524,066	3-Sep-2013	Electrochemical Production of Urea from NOx and Carbon Dioxide
LL 0006D1	US	13/956,983	1-Aug-2013			Electrochemical Production of Urea from NOx and Carbon Dioxide

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0008	US	61/417,938	30-Nov-2010			Electrochemical Production of Butanol from CO2 and Water
LL 0008A	US	13/307,965	30-Nov-2011	8,961,774	24-Feb-2015	Electrochemical Production of Butanol from Carbon Dioxide and Water
LL 0008A-D1	US	14/629,108	23-Feb-2015			Electrochemical Production of Butanol from Carbon Dioxide and Water
LL 0008A-PCT	PCT	PCT/US12/67388	30-Nov-2012			Electrochemical Production of Butanol from Carbon Dioxide and Water
LL 0009	US	61/417,956	30-Nov-2010			Heterocycle Catalyzed Carbonylation with Carbon Dioxide
LL 0009A	US	13/307,980	30-Nov-2011	8,568,581	29-Oct-2013	Heterocycle Catalyzed Carbonylation Hydroformylation with Carbon Dioxide
LL 0009A-D1	US	14/031,225	19-Sep-2013	9,309,599	12-Apr-2016	Heterocycle Catalyzed Carbonylation and Hydroformylation with Carbon Dioxide
LL 0009A-PCT	PCT	PCT/US12/67197	30-Nov-2012			Heterocycle Catalyzed Carbonylation Hydroformylation with Carbon Dioxide
LL 0010	US	61/418,034	30-Nov-2010			GLYOXAL FUEL CELL
LL 0011	US	61/418,054	30-Nov-2010			Heterocycle Catalyzed Hydroformylation with Carbon Dioxide
LL 0012	US	61/428,524	30-Dec-2010			Gas Phase Electrochemical Reduction of CO2
LL 0012A	US	13/340,155	29-Dec-2011			Gas Phase Electrochemical Reduction of Carbon Dioxide
LL 0012A-PCT	PCT	PCT/US12/72082	28-Dec-2012			Gas Phase Electrochemical Reduction of Carbon Dioxide
LL 0014	US	61/504,828	6-Jul-2011			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 AU	Australia	2012278948	18-Dec-2013			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 BR	Brazil	1120130333260	23-Dec-2013			Carbon Dioxide Capture and Conversion to Organic Products

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0014 CA	Canada	2,839,004	12-Dec-2013			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 CN	China	201280033349.4	3-Jan-2014			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 EP	EPO	12807293.1	15-Jan-2014			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 IN	India	246/KOLNP/2014	3-Feb-2014			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 JP	Japan	2014-519296	6-Jan-2014			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 KR	Korea	2014-7003048	5-Feb-2014			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014 PCT	PCT	PCT/US12/45576	5-Jul-2012			Carbon Dioxide Capture and Conversion to Organic Products
LL 0014A	US	13/541,933	5-Jul-2012	8,658,016	25-Feb-2014	Carbon Dioxide Capture and Conversion to Organic Products
LL 0014A-D1	US	14/184,265	19-Feb-2014			Carbon Dioxide Capture and Conversion to Organic Products
LL 0015	US	61/504,848	6-Jul-2011			Carbon Dioxide Conversion to Carboxylic Acids and Glycols
LL 0015 AU	Australia	2012278949	18-Dec-2013			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 BR	Brazil	1120140000522	2-Jan-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 CA	Canada	2,841,062	6-Jan-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 CN	China	201280033322.5	3-Jan-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 EP	EPO	12808004.1	15-Jan-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0015 IN	India	245/KOLNP/2014	3-Feb-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 JP	Japan	2014-519297	6-Jan-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 KR	Korea	2014-7003051	5-Feb-2014			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015 PCT	PCT	PCT/US12/45578	5-Jul-2012			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015A	US	13/542,152	5-Jul-2012	8,592,633	26-Nov-2013	Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0015A-D1	US	14/029,444	17-Sep-2013			Reduction of Carbon Dioxide to Carboxylic Acids, Glycols, and Carboxylates
LL 0016	US	61/609,088	9-Mar-2012			Catalyst Combinations for Multi-Carbon Products From Carbon Dioxide
LL 0016 AU	Australia	2013231005	15-Aug-2014			Reducing Carbon Dioxide to Products
LL 0016 BR	Brazil	1120140221901	8-Sep-2014			Reducing Carbon Dioxide to Products
LL 0016 CA	Canada	2,864,611	13-Aug-2014			Reducing Carbon Dioxide to Products
LL 0016 CN	China	201380011453.8	28-Aug-2014			Reducing Carbon Dioxide to Products
LL 0016 EP	EPO	13757264	9-Sep-2014			Reducing Carbon Dioxide to Products
LL 0016 IN	India	1718/KOLNP/2014	18-Aug-2014			Reducing Carbon Dioxide to Products
LL 0016 JP	Japan	2014-561087	5-Sep-2014			Reducing Carbon Dioxide to Products
LL 0016 KR	Korea	2014-7024882	4-Sep-2014			Reducing Carbon Dioxide to Products
LL 0016 PCT	PCT	PCT/US13/29425	6-Mar-2013			Reducing Carbon Dioxide to Products
LL 0016A	US	13/787,304	6-Mar-2013	8,845,878	30-Sep-2014	Reducing Carbon Dioxide to Products
LL 0016B	US	13/787,481	6-Mar-2013			Reducing Carbon Dioxide to Products
LL 0017A	US	13/724,885	21-Dec-2012	8,858,777	14-Oct-2014	Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-AU	Australia	2013316029	2-Mar-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0017A-BR	Brazil	BR1120150056407	13-Mar-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-CA	Canada	2,883,127	25-Feb-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-CN	China	201380048093.9	14-Mar-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017AD	US	14/471,152	28-Aug-2014			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-EP	EPO	13837298.2	10-Apr-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-IN	India	431/MUMNP/2015	27-Feb-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-JP	Japan	2015-531925	16-Mar-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-KR	Korea	2015-7009475	13-Apr-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-PCT	PCT	PCT/US13/53554	5-Aug-2013			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017A-SA	Saudi Arabia	515360131	12-Mar-2015			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017B	US	13/724,988	21-Dec-2012			System and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0017B-PCT	PCT	PCT/US13/53558	5-Aug-2013			System and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0018	US	61/701,167	14-Sep-2012			Reducing Two Carbon Intermediates to Products
LL 0018 PCT	PCT	PCT/US13/60000	16-Sep-2013			Heterocycle Catalyzed Electrochemical Process
LL 0018A	US	14/028,322	16-Sep-2013			Heterocycle Catalyzed Electrochemical Process
LL 0019	US	61/701,282	14-Sep-2012			High Pressure Electrolyzer and Process for the Electrochemical Reduction of Carbon Dioxide
LL 0019 PCT	PCT	PCT/US13/60004	16-Sep-2013			High Pressure Electrochemical Cell and Process for the Electrochemical Reduction of Carbon Dioxide

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0019A	US	14/427,934	12-Mar-2015			High Pressure Electrochemical Cell and Process for the Electrochemical Reduction of Carbon Dioxide
LL 0020	US	61/701,237	14-Sep-2012			Process and High Surface Area Electrodes for the Electrochemical Reduction of Carbon Dioxide
LL 0021	US	13/724,522	21-Dec-2012	8,641,885	4-Feb-2014	Multiphase Electrochemical Reduction of CO2
LL 0021 PCT	PCT	PCT/US13/53560	5-Aug-2013			Multiphase Electrochemical Reduction of CO2
LL 0021 PR	US	61/701,358	14-Sep-2012			Application of Crown Ethers in Electrochemical Reactions
LL 0021D	US	14/098,010	5-Dec-2013	9,175,409	3-Nov-2015	Multiphase Electrochemical Reduction of CO2
LL 0022	US	13/724,339	21-Dec-2012	9,175,407	3-Nov-2015	Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 AU	Australia	2013318500	4-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 BR	Brazil	BR1120150061931	19-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 CA	Canada	2,883,437	27-Feb-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 CN	China	201380048389.0	17-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 EP	EPO	13839580.1	31-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 IN	India	503/MUMNP/2015	10-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 JP	Japan	2015-533059	18-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 KR	Korea	2015-7009788	16-Apr-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 PCT	PCT	PCT/US13/53566	5-Aug-2013			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022 PR	US	61/715,060	17-Oct-2012			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0022 SA	Saudi Arabia	515360158	18-Mar-2015			Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0022A	US	13/934,500	3-Jul-2013	9,085,827	21-Jul-2015	Integrated Process for Producing Carboxylic Acids from Carbon Dioxide
LL 0023	US	13/724,878	21-Dec-2012	8,647,493	11-Feb-2014	Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 AU	Australia	2013318501	4-Mar-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 BR	Brazil	BR1120150062121	19-Mar-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 CA	Canada	2,883,367	27-Feb-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 CN	China	201380048544.9	18-Mar-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 EP	EPO	13838395.5	14-Apr-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 IN	India	504/MUMNP/2015	10-Mar-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 JP	Japan	2015-533060	18-Mar-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 KR	Korea	2015-7009795	16-Apr-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 PCT	PCT	PCT/US13/53569	5-Aug-2013			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023 SA	Saudi Arabia	515360159	18-Mar-2015			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0023D	US	14/152,417	10-Jan-2014			Electrochemical Co-Production of Chemicals Employing the Recycling of a Hydrogen Halide
LL 0024	US	13/724,647	21-Dec-2012	8,845,876	30-Sep-2014	Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0024 AU	Australia	2013318502	4-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 BR	Brazil	BR1120150062148	19-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 CA	Canada	2,883,900	3-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 CN	China	201380048416.4	17-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 EP	EPO	13838376.5	1-Apr-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 IN	India	507/MUMNP/2015	10-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 JP	Japan	2015-533061	18-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 KR	Korea	2015-7009797	16-Apr-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 PCT	PCT	PCT/US13/53580	5-Aug-2013			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024 SA	Saudi Arabia	515360151	18-Mar-2015			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0024D	US	14/463,430	19-Aug-2014			Electrochemical Co-Production of Products with Carbon-Based Reactant Feed to Anode
LL 0025	US	13/724,231	21-Dec-2012	8,845,875	30-Sep-2014	Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 AU	Australia	2013318507	4-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 BR	Brazil	BR1120150061966	19-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 CA	Canada	2,883,752	3-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol



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LL 0025 CN	China	201380048712.4	19-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 EP	EPO	13839631.2	31-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 IN	India	506/MUMNP/2015	10-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 JP	Japan	2015-533063	18-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 KR	Korea	2015-7009896	16-Apr-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 PCT	PCT	PCT/US13/53607	5-Aug-2013			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025 SA	Saudi Arabia	515360160	18-Mar-2015			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0025D	US	14/470,700	27-Aug-2014			Electrochemical Reduction of CO2 with Co-Oxidation of an Alcohol
LL 0026	US	13/724,807	21-Dec-2012	8,692,019	8-Apr-2014	Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 AU	Australia	2013318506	6-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 BR	Brazil	BR1120150061133	19-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 CA	Canada	2,883,748	3-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 CN	China	201380048396.0	17-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 EP	EPO	13839027.3	15-Apr-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 IN	India	505/MUMNP/2015	10-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0026 JP	Japan	2015-533062	18-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 KR	Korea	2015-7009898	16-Apr-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 PCT	PCT	PCT/US13/53600	5-Aug-2013			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026 SA	Saudi Arabia	515360161	18-Mar-2015			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0026D1	US	14/246,631	7-Apr-2014			Electrochemical Co-Production of Chemicals Utilizing a Halide Salt
LL 0027	US	13/724,996	21-Dec-2012	8,691,069	8-Apr-2014	A Method and System for the Electrochemical Co-Production of Halogen and Carbon Monoxide for Carbonylated Products
LL 0027 CN	China	201380048467.7	18-Mar-2015			A Method and System for the Electrochemical Co-Production of Halogen and Carbon Monoxide for Carbonylated Products
LL 0027 EP	EPO	13839836.7	15-Apr-2015			A Method and System for the Electrochemical Co-Production of Halogen and Carbon Monoxide for Carbonylated Products
LL 0027 PCT	PCT	PCT/US13/53592	5-Aug-2013			A Method and System for the Electrochemical Co-Production of Halogen and Carbon Monoxide for Carbonylated Products
LL 0027 PR	US	61/703,232	19-Sep-2012			A Method and System for the Electrochemical Co-Production of Halogen and Carbon Monoxide
LL 0027D1	US	14/203,158	10-Mar-2014			A Method and System for the Electrochemical Co-Production of Halogen and Carbon Monoxide for Carbonylated Products
LL 0028	US	13/724,719	21-Dec-2012	9,303,324	5-Apr-2016	Electrochemical Co-Production of Chemicals with Sulfur-Based Reactant Feeds to Anode
LL 0028 CN	China	201380048487.4	18-Mar-2015			Electrochemical Co-Production of Chemicals with Sulfur-Based Reactant Feeds to Anode

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LL 0028 EP	EPO	13839654.4	1-Apr-2015			Electrochemical Co-Production of Chemicals with Sulfur-Based Reactant Feeds to Anode
LL 0028 IN	India	508/MUMNP/2015	10-Mar-2015			Electrochemical Co-Production of Chemicals with Sulfur-Based Reactant Feeds to Anode
LL 0028 PCT	PCT	PCT/US13/53587	5-Aug-2013			Electrochemical Co-Production of Chemicals with Sulfur-Based Reactant Feeds to Anode
LL 0028A	US	62/190,675	9-Jul-2015			Electrochemical Co-Production of Chemicals with Sulfur-Based Reactant Feeds to Anode
LL 0028AC	US	15/089,126	1-Apr-2016			Electrochemical Co-Production of Chemicals from Carbon Dioxide Using Sulfur-Based Reactant Feeds to Anode
LL 0029	US	13/724,082	21-Dec-2012	8,821,709	2-Sep-2014	System and Method for Oxidizing Organic Compounds While Reducing Carbon Dioxide
LL 0029 CA	Canada	2,883,744	3-Mar-2015			System and Method for Oxidizing Organic Compounds While Reducing Carbon Dioxide
LL 0029 PCT	PCT	PCT/US13/53583	5-Aug-2013			System and Method for Oxidizing Organic Compounds While Reducing Carbon Dioxide
LL 0029D1	US	14/036,571	25-Sep-2013			System and Method for Oxidizing Organic Compounds While Reducing Carbon Dioxide
LL 0030	US	13/724,768	21-Dec-2012	8,444,844	21-May-2013	Electrochemical Co-Production of a Glycol and an Alkene Employing Recycled Halide
LL 0030 PCT	PCT	PCT/US13/53561	5-Aug-2013			Electrochemical Co-Production of a Glycol and an Alkene Employing Recycled Halide
LL 0030D1	US	13/863,988	16-Apr-2013	9,080,240	14-Jul-2015	Electrochemical Co-Production of a Glycol and an Alkene Employing Recycled Halide
LL 0031 PR	US	61/720,670	31-Oct-2012			Hydrogen and Halogen Mediated Production of Chemicals
LL 0032 CA	Canada	2,895,253	15-Jun-2015			Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products
LL 0032 EP	EPO	13864798.7	17-Jun-2015			Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0032 PCT	PCT	PCT/US13/77610	23-Dec-2013			Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products
LL 0032 PR	US	61/745,204	21-Dec-2012			Oxalic Acid Production Process Incorporating a Halogen Loop
LL 0032 SA	Saudi Arabia	515360633	18-Jun-2015			Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products
LL 0032A	US	14/220,764	20-Mar-2014			Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products
LL 0032B	US	14/220,840	20-Mar-2014	9,267,212	23-Feb-2016	Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products
LL 0032C	US	14/220,893	20-Mar-2014			Method and System for Production of Oxalic Acid and Oxalic Acid Reduction Products
LL 0033	US	61/784,145	14-Mar-2013			Method and System for the Capture and Conversion of Anodically Produced Bromine to Alcohols and an Integrated Process for the Removal of Bromine from a Process Stream and Chemical Conversion to Diols
LL 0033 PCT	PCT	PCT/US14/29311	14-Mar-2014			Method and System for the Capture and Conversion of Anodically Produced Halogen to Alcohols
LL 0034	US	61/784,500	14-Mar-2013			Integrated Process for Electrochemically Induced Reactions of Halorganic Molecules and Techniques for Electrochemically Induced C-C Bond Formation by Dehalogenation
LL 0034A	US	61/953,038	14-Mar-2014			Integrated Process for Electrochemically Induced Reactions of Halorganic Molecules and Techniques for Electrochemically Induced C-C Bond Formation by Dehalogenation
LL 0034B	US	62/132,869	13-Mar-2015			Integrated Process for Electrochemically Induced Reactions of Halorganic Molecules and Techniques for Electrochemically Induced C-C Bond Formation by Dehalogenation

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0035	US	61/784,728	14-Mar-2013			Method for the Solvothermal Synthesis of Sub 100-nm Indium Nanoparticles in a Nonpolar Solvent
LL 0036 PR	US	61/784,922	14-Mar-2013			Combinatorial Cell for Rapid Evaluation of Materials, Solvents, Membranes and Separators for Electrochemical Applications
LL 0036	US	14/209,703	13-Mar-2014			Electrochemical cell system for rapid evaluation of electrochemical processes and materials used therein.
LL 0037	US	61/785,473	14-Mar-2013			New Electrode Materials for Electrochemical Cells
LL 0038	US	61/794,230	15-Mar-2013			Method for Producing Oxalic Acid from CO ₂
LL 0039	US	61/794,704	15-Mar-2013			Method for Producing Acetic Acid from CO ₂ Feedstock
LL 0040	US	61/816,531	26-Apr-2013			Production of Monoethylene Glycol or Other Chemicals from Carbon Dioxide and Hydrogen
LL 0041	US	14/422,322	18-Feb-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041 PCT	PCT	PCT/US13/56457	23-Aug-2013			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041CA	Canada	2,882,369	18-Feb-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041CN	China	201380051223.4	30-Mar-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041EP	EPO	13830513.1	6-Mar-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041IN	India	373/MUMNP/2015	20-Feb-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041JP	Japan	2015-528700	23-Feb-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode
LL 0041KR	Korea	2015-7007359	23-Mar-2015			Reducing Carbon Dioxide to Products with an Indium Oxide Electrode

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0041PR	US	61/692,293	23-Aug-2012			An Indium Electrode Based Electrochemical Cell for the Conversion of Carbon Dioxide Formate Salts and Acid
LL 0042	US	61/844,755	10-Jul-2013			Selective Hydrogenation of Oxalic Acid
LL 0043	US	61/846,944	16-Jul-2013			Production of Monoethylene Glycol or Other Chemicals from Carbon Dioxide and Hydrogen
LL 0044	US	61/905,691	18-Nov-2013			C4, Acrylic Acid, Terephthalic Acid
LL 0044A	US	62/081,379	18-Nov-2014			C4, Acrylic Acid, Terephthalic Acid
LL 0045	US	61/911,312	3-Dec-2013			Aqueous Process for Producing Multi-Carbon Carboxylic Acids, Alcohols, and Their Esters From Carbon Dioxide
LL 0045A	US	62/081,390	18-Nov-2014			Aqueous Process for Producing Multi-Carbon Carboxylic Acids, Alcohols, and their Esters from Carbon Dioxide
LL 0046	US	61/930,785	23-Jan-2014			A Method and System for Closed-Loop Hydrogen Energy Storage Utilizing Organic Compounds
LL 0046PR2	US	62/107,096	23-Jan-2015			A Method and System for Closed-Loop Hydrogen Energy Storage Utilizing Organic Compounds
LL 0046PR3	US	62/281,946	22-Jan-2016			Method and System for Closed-Loop Hydrogen Energy Storage Utilizing Organic Compounds
LL 0047	US	61/945,533	27-Feb-2014			Method and System for Production of Glycine and Related Compounds from Oxalic Acid
LL 0047A	US	62/121,866	27-Feb-2015			Method and System for Production of Glycine and Related Compounds from Oxalic Acid
LL 0048	US	61/946,869	2-Mar-2014			Method and System for the Production of Acrylic Acid
LL 0048A	US	62/126,328	27-Feb-2015			Method and System for the Production of Acrylic Acid
LL 0049	US	61/946,476	28-Feb-2014			Method and System for Production of A-Hydroxy Carboxylic Acids

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0049A	US	62/126,354	27-Feb-2015			Method and System for Production of A-Hydroxy Carboxylic Acids
LL 0050	US	61/979,849	15-Apr-2014			Method and System for Electrochemically Regenerated Oxoammonium-Catalyzed Oxidation of Alcohols
LL 0050A	US	62/148,008	15-Apr-2015			Method and System for Electrochemically Regenerated Oxoammonium-Catalyzed Oxidation of Alcohols
LL 0051	US	61/989,937	7-May-2014			Method and System for electrochemical Synthesis of Terephthalic Acid From Carbon Dioxide and Benzene
LL 0051A	US	61/990,380	8-May-2014			Method and System for Synthesis of Terephthalic Acid From Carbon Dioxide and Benzene
LL 0052	US	62/004,544	29-May-2014			Method and System for Production of Oxalic Acid and Related Compounds From Carbon Dioxide
LL 0052A	US	14/726,061	29-May-2015			Method and System for Electrochemical Reduction of Carbon Dioxide Employing a Gas Diffusion Electrode
LL 0052A-PCT	PCT	PCT/US15/33378	29-May-2015			Method and System for Electrochemical Reduction of Carbon Dioxide Employing a Gas Diffusion Electrode
LL 0053	US	62/014,465	19-Jun-2014			Integrated Process for Co-Production of Carboxylic Acids and Halogen Products from Carbon Dioxide
LL 0053 PCT	PCT	PCT/US14/46555	14-Jul-2014			Integrated Process for Co-Production of Carboxylic Acids and Halogen Products from Carbon Dioxide
LL 0054	US	62/013,453	17-Jun-2014			Method and System for Purification of Oxalate and Oxalic Acid
LL 0055	US	62/060,340	6-Oct-2014			Method and System for Production of Ethylene Glycol
LL 0055A	US	62/063,270	13-Oct-2014			Method and System for Production of Ethylene Glycol

Execution Version

Liquid Light Docket #	Country	Patent Appl. #	PCT, Regional or National Filing Date	Granted Patent #	Issued	Title
LL 0055B	US	62/072,215	29-Oct-2014			Method and System for Production of Ethylene Glycol
LL 0056	US	62/107,217	23-Jan-2015			Method and System for Conversion of Formate to Oxalate
LL 0056PR2	US	62/281,958	22-Jan-2016			Method and System for Conversion of Formate to Oxalate
LL 0057	US	62/108,407	27-Jan-2015			Integrated Process for Producing Formic Acid and Oxalic Acids from Carbon Dioxide
LL 0058	US	62/191,625	13-Jul-2015			Gas Diffusion Electrode and Electrochemical Cell Employing the Gas Diffusion Electrode
LL 0059	US	62/250,898	4-Nov-2015			Method for Producing Carboxylic Acids Utilizing Electrochemical Acidification
LL 0060	US	62/271,221	22-Dec-2015			System and Method for the Co-Production of Oxalic Acid and Acetic Acid
LL 0061	US	62/275,101	5-Jan-2016			Method and System for Electrochemical Acidification and Electrodialysis Employing a Hydrogen Anode
LL 0062	US	62/278,282	13-Jan-2016			Method and System for Producing Oxalic Acid Utilizing Thermal Conversion and Electrochemical Acidification
LL 11-1-1	US	61/450,704	9-Mar-2011			Process for Making Formic Acid
LL 11-1-2	US	13/416,896	9-Mar-2012	8,562,811	22-Oct-2013	System and Process for Making Formic Acid
LL 11-1-2D1	US	13/957,021	1-Aug-2013			System and Process for Making Formic Acid
LL 12-1-1	US	61/607,240	5-Mar-2012			Catalyst Combination for Production of Formic Acid

Annex B: Know-How

- 1 All data, diagrams, analyses and reports, including raw experimental data from the analytical chemistry, chemistry, and engineering departments, technical reports, economic analyses, Aspen Plus, Excel, and other materials and energy process models, CAD files of electrochemical cells, other reactors, and equipment, CFD analyses of cell designs, LabVIEW programs for the control and data acquisition of electrochemical cell test benches, standard operation procedures for the operation of in-house equipment, hazard and operability analyses of larger scale experiments, process flow diagrams of overall processes and sub processes, piping and instrumentation diagrams of experimental apparatuses developed in-house, and the literature library, including, but not limited to, any copyright, copyrightable subject matter and/or database rights included in such;
- 2 all know-how captured in written form, including but not limited to all information, unpatented inventions (whether or not patentable), improvements, practices, formula, trade secrets, engineering studies, techniques, methods, procedures, knowledge, results, test data, analytical and quality control data, protocols, processes, models, designs, and other technical or non-technical information and furthermore all internal lab journals, technical project reports, records and all reports which Liquid Light owns and is entitled to transfer ownership of and as provided by development partners, including but not limited to De Nora, Covestro, Princeton University, Seton Hall University, Georgian Court University, Nexant and MATRIC, any copyright, copyrightable subject matter and/or database rights included in such.