

TRADEMARK ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

ETAS ID: TM836569

SUBMISSION TYPE:	NEW ASSIGNMENT		
NATURE OF CONVEYANCE:	SECURITY INTEREST		
CONVEYING PARTY DATA			
Name	Formerly	Execution Date	Entity Type
C3 NANO, INC.		08/29/2023	Corporation: DELAWARE
RECEIVING PARTY DATA			
Name:	NEWLIGHT CAPITAL LLC		
Street Address:	1135 KILDAIRE FARM ROAD, SUITE 200		
City:	CARY		
State/Country:	NORTH CAROLINA		
Postal Code:	27511		
Entity Type:	Limited Liability Company: NORTH CAROLINA		
PROPERTY NUMBERS Total: 3			
Property Type	Number	Word Mark	
Registration Number:	5533463	C3 NANO	
Registration Number:	5723953	NANOGLUE	
Registration Number:	6073924	ACTIVEGRID	
CORRESPONDENCE DATA			
Fax Number:	6179518736		
<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:	6173417729		
Email:	katarzyna.gaysunas@morganlewis.com		
Correspondent Name:	Katarzyna Gaysunas		
Address Line 1:	1 Federal St		
Address Line 2:	c/o Morgan, Lewis & Bockius LLP		
Address Line 4:	Boston, MASSACHUSETTS 02110-1726		
NAME OF SUBMITTER:	Katarzyna Gaysunas		
SIGNATURE:	/Katarzyna Gaysunas/		
DATE SIGNED:	09/01/2023		
Total Attachments: 30			
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SHORT FORM INTELLECTUAL PROPERTY SECURITY AGREEMENT

This SHORT FORM INTELLECTUAL PROPERTY SECURITY AGREEMENT (the “Short Form Agreement”) is made by **C3 NANO, INC.**, a Delaware corporation (“Grantor”), and dated as of August 29, 2023, in favor of **NEWLIGHT CAPITAL LLC**, a North Carolina limited liability company, as servicer (“Servicer”), (i) for itself and for the benefit of **UMB BANK, NATIONAL ASSOCIATION**, as Trustee, solely in its capacity as disbursing agent (“Disbursing Agent”) and the Insurer, and (ii) as collateral agent for the benefit of the Trustee under the Trust Indenture.

WITNESSETH:

WHEREAS, the Grantor and Servicer entered into an Intellectual Property Security Agreement dated as of the date hereof (as amended, restated, modified or supplemented from time to time, the “Intellectual Property Security Agreement”), and this Short Form Agreement is a supplement to the Intellectual Property Security Agreement; and

WHEREAS, this Short Form Agreement is executed for the purpose of filing a short form intellectual property security agreement with the United States Patent and Trademark Office (the “USPTO”) and the United States Copyright Office (the “USCO”), which sets forth the Grantor’s pledge of its intellectual property as a first priority security interest for certain indebtedness and other obligations of Grantor;

NOW, THEREFORE, in consideration of the premises, and for other good and valuable consideration as set forth in the Intellectual Property Security Agreement, the receipt and sufficiency of which are hereby acknowledged, the Grantor and Servicer hereby agree as follows:

1. GRANT OF SECURITY INTEREST.

Grantor hereby pledges, assigns and grants to Servicer (and its successors and permitted assigns), (x)(i) for the benefit of the Servicer, (ii) as representative and for the benefit of the Insurer and (iii) as representative and for the benefit of Disbursing Agent, in order to secure prompt repayment and performance of any and all Obligations and in order to secure prompt performance by Grantor and each other Co-Obligor of each of their agreements, covenants and duties under the Disbursement Documents, and (y) as collateral agent for the benefit of the Trustee under the Trust Indenture in order to secure prompt repayment of any and all obligations of Grantor and each other Co-Obligor under the Trust Transaction Documents and in order to secure prompt performance by Grantor and each other Co-Obligor of each of their agreements, covenants and duties under the Trust Transaction Documents, a continuing security interest in and a lien upon, and a collateral assignment of, all of the following (being collectively referred to herein as the “IP Collateral”):

- a. all of its now existing or hereafter acquired right, title and interest in and to all patents, trademarks, copyrights, inventions, invention disclosures and improvements, and all applications, registrations and recordings relating to the foregoing, and any reissues, divisions, continuations, continuations-in-part, renewals, extensions, and/or reexaminations of any of the foregoing, as may at any time be filed in the USPTO or in any similar office or agency of the United States, any State thereof, any political subdivision thereof, or in any other country, including, without limitation, those set forth on Schedule A; provided, however, such security interest shall not extend to any “intent-to-use” trademark application filed pursuant to Section 1(b) of the Lanham Act, 15 U.S.C. § 1051, prior to the filing of a “Statement of Use” pursuant to Section 1(d)

of the Lanham Act or an "Amendment to Allege Use" pursuant to Section 1(c) of the Lanham Act with respect thereto, to the extent that, and solely during the period, if any, in which, the grant of a security interest therein would impair the validity or enforceability of any registration that issues from such intent-to-use application under applicable federal law (it being understood that after such period such intent-to-use application shall be automatically subject to the security interest granted herein);

- b. all rights of any kind whatsoever accruing under any of the foregoing throughout the world, including, without limitation, all rights under and interests in any and all patent, copyright or trademark licenses, whether written or oral, with any other party, and whether Grantor is a licensee or licensor under any such license (all of the foregoing are referred to, collectively, as the "Licenses");
- c. all income, fees, royalties and other payments at any time due or payable with respect thereto, including, without limitation payments under any and all Licenses at any time entered into in connection therewith; and
- d. any and all claims and/or causes of actions with respect to any of the foregoing, whether occurring before, on, or after the date hereof, including without limitation all rights to and claims for damages, restitution and injunctive and other legal and equitable relief for past, present, and/or future infringement, violation, misuse, breach, or default, with the right but not the obligation to sue for such legal and equitable relief and to collect, or otherwise recover, any such damages.

2. MISCELLANEOUS

- a. To the extent that Grantor creates or acquires any items of the type described in Section 1 after the date hereof, the same shall immediately constitute IP Collateral for purposes hereof from and after the date of such creation or acquisition and shall immediately be subject to the security interest and assignment set forth herein. Grantor shall give to Servicer written notice of any such creation or acquisition (that is not Excluded Property) within 15 days thereof. Upon the request of Servicer, Grantor shall promptly execute any and all assignments, agreements, instruments, documents and other papers as may be reasonably requested by Servicer to evidence and/or perfect the security interest in and collateral assignment of such items in favor of Servicer, including, without limitation, in Servicer's discretion, a modification, amendment or supplement hereof or a new short form intellectual property security agreement with respect thereto.
- b. Grantor authorizes the Commissioner for Patents, the Commissioner for Trademarks, Commissioner of Copyrights and any other government officials to record this Short Form Agreement upon request of Servicer.
- c. This Short Form Agreement has been entered into pursuant to, and in conjunction with, the Intellectual Property Security Agreement, and the terms and provisions thereof are incorporated by reference herein. The rights and remedies of Servicer with respect to the security interests described herein are as provided by the Intellectual Property Security Agreement and nothing in this Short Form Agreement shall be deemed to limit such rights and remedies.
- d. This Short Form Agreement is binding on and shall inure to the benefit of the parties hereto, and their respective successors and permitted assigns.

- e. All capitalized terms not expressly defined herein shall have the definitions ascribed to them in the Intellectual Property Security Agreement and the Disbursing Agreement (as defined in the Intellectual Property Security Agreement) and are incorporated herein by reference. If there is a conflict between the definitions, terms, and/or provisions of this Short Form Agreement and the Intellectual Property Security Agreement, the definitions, terms, and/or provisions of the Intellectual Property Security Agreement shall control.
- f. This Short Form Agreement may be executed in any number of counterparts and by different parties on separate counterparts, each of which, when executed and delivered, shall be deemed to be an original, and all of which, when taken together, shall constitute but one and the same agreement. Delivery of an executed signature page or counterpart (or electronic image or scan transmission (such as a “pdf” file) thereof), whether by facsimile transmission, email, similar form of electronic transmission or otherwise (and whether executed manually, electronically or digitally), shall be effective as delivery of a manually executed counterpart of this Short Form Agreement and shall create a valid and binding obligation of the party executing the same or on whose behalf such signature page or counterpart is executed.
- g. THIS SHORT FORM AGREEMENT SHALL BE GOVERNED BY NEW YORK LAW, WITHOUT REGARD TO PRINCIPLES OF CONFLICTS OF LAW THAT WOULD RESULT IN THE APPLICATION OF THE LAW OF A STATE OTHER THAN NEW YORK.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the undersigned have duly executed this Short Form Agreement as of the date first above written.

C3 NANO, INC., as Grantor

DocuSigned by:
Cliff Morris
By: _____
Name: Clifford M. Morris
Title: Chief Executive Officer

ACCEPTED AND AGREED:

NEWLIGHT CAPITAL LLC, as Servicer

By: _____
Name:
Title:

IN WITNESS WHEREOF, the undersigned have duly executed this Short Form Agreement as of the date first above written.

C3 NANO, INC., as Grantor

By: _____
Name:
Title:

ACCEPTED AND AGREED:

NEWLIGHT CAPITAL LLC, as Servicer

By:  _____
Name: Erwin Gostomski
Title: Managing Director

SCHEDULE A

Intellectual Property

Registered Trademarks and Trademark Applications:

<u>Company/ Subsidiary Owner</u>	<u>Trademark</u>	<u>Jurisdiction</u>	<u>App. No.</u>	<u>App. Date</u>	<u>Reg. No.</u>	<u>Reg. Date</u>			
C3 Nano, Inc.	C3Nano®	USA	N/A	N/A	5,533,463	August 7, 2018			
C3 Nano, Inc.	Nanoglu®	USA	N/A	N/A	5,723,953	April 9, 2019			
C3 Nano, Inc.	Activegrid®	USA	N/A	N/A	6,073,924	June 9, 2020			
C3 Nano, Inc.	ActiveguardHC™	See Footnote ³	Trademark claimed by Common Law Usage						
C3 Nano, Inc.	Topaz™	“	Trademark claimed by Common Law Usage						
C3 Nano, Inc.	TP™	“	Trademark claimed by Common Law Usage						

Patents and Patent Applications:

Note for all Patents listed herein, the Company and Patent Owner is C3 Nano, Inc. All Inventors have assigned the Patents to C3 Nano, Inc

<u>Inventors</u>	<u>Patent Family / Assignment Number</u>	<u>Patent</u>	<u>Jurisdiction</u>	<u>App. No. / Publication No.</u>	<u>App. Date / Publ'n Date</u>	<u>Patent No.</u>	<u>Issued Date</u>
Ajay Virkar, Ying-Syi Li, Melburne C. Lemieux	01	Metal Nanowire Networks and Transparent Conductive Material	USA	13/530,822 2013/0341074	06-22-2012 12-26-13	10,029,916	07-24-2018
Ajay Virkar, Ying-Syi Li, Melburne C. Lemieux	01	Metal Nanowire Networks and Transparent Conductive Material (Div)	USA	16/018,889 2018/0297840	06-26-2018 10-18-2018		

³ The Company asserts common law trademark rights in the USA and in other jurisdictions that recognize common law trademark rights.

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	Taiwan	102122029 201405583	6/20/2013 2/1/2014	1627640	06-21-2018
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	USA	13/664,159 2013/0342221	10-30-2012 12/26/2013	9,920,207	03-20-2018
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	USA	15/886,201 2018-0155558	02-01-2018 06-07-2018	10,781,324	09-22-2020
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	USA	16/994,519 2020-0377744	08-14-2020 12-03-2020		
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	China	201380033141.7 CN104685577A	6/20/2013 6/3/2015	ZL201380033141.7	01/16/2018
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	EPO	13806288.0 2 864 990	6/20/2013 04/29/2015	2864990	10-02-2019
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	EPO	19200682.3 3611231	10-01-2019 02-19-2020	3611231	09/14/2022
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	Hong Kong	42020013168.8 40023116	08-04-2020 11-27-2020	HK40023116	01/06/2023
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	Japan	2015-518580 2015-530693	6/20/2013 10/15/2015	6392213	08/31/2018

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	Korea	10-2015-7001771 KR20150040865A	6/20/2013 04-15-2015	10-2027623	09-25-2019
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	Korea	10-2019-7028001	09-24-2019	10-2143963	08-06-2020
Ajay Virkar; Ying-Syi Li; Xiqiang Yang; Melbourne C. Lemieux	05	Metal Nanostructured Networks and Transparent Conductive Material	Korea	10-2020-7022803	08-06-2020	10-2376788	03-16-2022
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks; Fusing Solutions with Reducing Agents and Methods for Forming Metal Networks	Taiwan	103106126 TW201446491A	2/24/2014 12-16-2014	1624357	05-21-2018
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks; Fusing Solutions with Reducing Agents and Methods for Forming Metal Networks	USA	13/777,802 2014/0238833	02-26-2013 08/28/2014	10,020,807	07-10-2018
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks; Fusing Solutions with Reducing Agents and Methods for Forming Metal Networks (Div)	USA	16/001,472 2018-0287608	06-06-2018 10-04-2018		
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks and Fusing Solutions with Reducing Agents	China	201480018434.0 CN105102555A	2/21/2014 11/25/2015	ZL 201480018734.0	02-16-2018

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks and Fusing Solutions with Reducing Agents	China	201810047475.4 CN108357168A	01-18-2018 08-03-2018		
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks and Fusing Solutions with Reducing Agents	EPO	14757422.2 2961801	2/21/2014 1/6/2016		
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks and Fusing Solutions with Reducing Agents	Japan	2015-558993 JP2016519206A	2/21/2014 06-30-2016	6387021	8/17/2018
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks and Fusing Solutions with Reducing Agents	Japan	2018-151356 2019-007085	08-10-2018 01-17-2019	6657336	02-07-2020
Ajay Virkar; Xiqiang Yang; Ying-Syi Li; Dennis McKean; Melbourne C. Lemieux	06	Fused Metal Nanostructured Networks and Fusing Solutions with Reducing Agents	Korea	10-2015-7026866 KR20160010406A	2/21/2014 01-27-2016	10-1888734	08-08-2018
Xiqiang Yang; Ying-Syi Li; Yung-Yu Huang; Christopher Scully; Clifford M. Morris; Ajay Virkar	07	Transparent Conductive Coatings Based on Metal Nanowires and Polymer Binders, Solution Processing Thereof, and Patterning Approaches	Taiwan	103140507 201525086	11/21/2014 7-1-2015	I553069	10-11-2016
Xiqiang Yang; Ying-Syi Li; Yung-Yu Huang; Christopher S. Scully; Clifford M. Morris; Ajay Virkar	07	Transparent Conductive Coatings Based on Metal Nanowires and Polymer Binders, Solution Processing Thereof, and Patterning Approaches	USA	14/087,669 2015/0144380	11/22/2013 5/28/2015	11,274,223	03/15/2022

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Method for Forming Patterned Electrically Conductive Transparent Coating Including Fused Metal Nanowires	USA	17/590,013 2022-0154025	02/01/2022 05/19/2022		
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Transparent Conductive Coatings Based on Metal Nanowires	China	201480071606.2 CN105874889A	11/14/2014 08/17/2016	ZL201480071606.2	07/16/2019
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Transparent Conductive Coatings Based on Metal Nanowires	China	201910542227.1 CN110204950A	06-21-2019 09-06-2019		
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Transparent Conductive Coatings Based on Metal Nanowires	Hong Kong	42020003270.4 40013166A	02-25-2020 08-07-2020		
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Transparent Conductive Coatings Based on Metal Nanowires	EPO	14863676.4 3072373	11/14/2014 09/28/2016		
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Transparent Conductive Coatings Based on Metal Nanowires	Japan	2016-533161 2017-505509	11-14-2014 02-16-2017	6644684	01-10-2020
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Vitkar	07	Transparent Conductive Coatings Based on Metal Nanowires	Japan	2020-001550 2020-074310	01-08-2020 05-14-2020		

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Virkar	07	Transparent Conductive Coatings Based on Metal Nanowires and Polymer Binders, Solution Processing Thereof, and Patterning Approaches	Japan	2022-002511 2022-068877	01-11-2022 05-10-2022		
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Virkar	07	Transparent Conductive Coatings Based on Metal Nanowires	Korea	10-2016-7016609	11-14-2014	10-2349263	01/05/2022
Xiqiang Yang, Ying-Syi Li, Yung-Yu Huang, Christopher S. Scully, Clifford M. Morris, Ajay Virkar	07	Transparent Conductive Coatings Based on Metal Nanowires	Korea	10-2022-7000334 10-2022-0005646	01-05-2022 01-13-2022		
Yu Kambe, Yung-Yu Huang, Christopher S. Scully, Xiqiang Yang, Ajay Virkar	09	Formable Transparent Conductive Films with Metal Nanowires	USA	14/680,390	04/07/2015	11,343,911	05/24/2022
Yu Kambe, Yung-Yu Huang, Christopher S. Scully, Xiqiang Yang, Ajay Virkar	09	Formable Transparent Conductive Films with Metal Nanowires	USA	17/728,324 2022-0256694	04/25/2022 08/11/2022		
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Mariko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks for the Formation of Transparent Conductive Films with Fused Networks	Taiwan	104124429 201610006	07/28/2015 03/16/2016	1577752	04-11-2017

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Mariko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks for the Formation of Transparent Conductive Films with Fused Networks	Taiwan	105143754 201713735	12-28-2016 04-16-2017	1621669	04-21-2018
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Mariko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks for the Formation of Transparent Conductive Films with Fused Networks	USA	14/448,504	07-31-2014	9,183,968	11/10/2015
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Mariko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks for the Formation of Transparent Conductive Films with Fused Networks (Continuation)	USA	14/464,332	08-20-2014	9,150,746	10/06/2015
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Mariko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks for the Formation of Transparent Conductive Films with Fused Networks	USA	14/848,697 2016-0032127	09-09-2015 02-04-2016	9,447,301	09/20/2016

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks for the Formation of Transparent Conductive Films with Fused Networks (Cont)	USA	15/247,533 2016-0369118	08-25-2016 12-22-2016	10,100,213	10/16/2018
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Transparent Conductive Films With Fused Networks (Cont.)	USA	16/127,462 2019-0010347	09-11-2018 01-10-2019	10,870,772	12-22-2020
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Transparent Conductive Films With Fused Networks (Cont.)	USA	16/952,372	11-19-2020	11,512,215	11/29/2022
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Ink For The Formation Of Transparent Conductive Films With Fused Networks (Cont.)	USA	17/988,885	11/17/2022		

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	China	201580041760.X CN106575541A	7-27-2015 04-19-2017	ZL201580041760.X	07-07-2020
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	China	202010573983.3 CN 111621201 A	06-22-2020 09-04-2020		
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	EPO	15827431.6 3180792	7-27-2015 06-21-2017	3180792	12-30-2020
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	Japan	2017-505219 2017-529419	07-27-2015 10-05-2017	6577018	08-30-2019

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	Japan	2019-151031 2020-073628	08-21-2019 05-14-2020	7120973	08/08/2022
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	Japan	2021-112558 2021-167425	07-07-2021 10-21-2021		
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	Korea	10-2017-7005587 KR20170039253A	7-27-2015 04-10-2017	10-2056146	12-10-2019
Ying-Syi Li, Xiqiang Yang, Yu Kambe, Xiaofeng Chen, Hua Gu, Steven Michael Lam, Melanie Marko Inouye, Arthur Yung-Chi Cheng, Alex Da Zhang Tan, Christopher S. Scully, Ajay Virkar	11	Metal Nanowire Inks For The Formation Of Transparent Conductive Films With Fused Networks	Korea	10-2019-7036371	12-09-2019	10-2283361	07/23/2021

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films	Taiwan	104132624 201627428	10-2-2015 8-1-2016	I620802	04-11-2018
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Coatings and Transparent Conductive Films	USA	62/059,376	10-03-2014		
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films	USA	14/577,669 2016-0096967 A1	12-19-2014 04-07-2016		
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films (Div.)	USA	15/889,594 2018-0179410 A1	02-06-2018 06-28-2018	10,738,212	08-11-2020
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films	China	201580060974.1 CN107112302A	10-02-2015 08-29-2017	ZL201580060974.1	05-26-2020
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films	Hong Kong	18101954.2 1242838A	02-08-2018 06-29-2018	HK1242838	03/12/2021
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films	China	202010371396.6 CN111378309A	05-06-2020 07-07-2020	ZL202010371396.6	04/26/2022
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Fillers for Transparent Coatings and Transparent Conductive Films	Japan	2017-517776 2018-500194	10-02-2015 01-11-2018	6823591	01/13/2021

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ajay Virkar, Faraz Azadi Manzour, Xiqiang Yang, Hua Gu	13	Property Enhancing Filters for Transparent Coatings and Transparent Conductive Films	Korea	10-2017-7012065	10-02-2015	10-2460116	10/25/2022
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films With Control Of Light Hue Using Nanoscale Colorants	Taiwan	104134114 201621923	10-16-2015 6-16-2016	1595514	08-11-2017
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films with Control of Light Hue Using Nanoscale Colorants	USA	14/627,400 2016/0108256	02/20/2015 04-21-2016	11,111,396	09/07/2021
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films with Control of Light Hue Using Nanoscale Colorants	USA	17/370,701 2021/0340386	07/08/2021 11/04/2021		
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films With Control Of Light Hue Using Nanoscale Colorants	China	201580062938.9 CN107075280A	10-15-15 08-18-2017	ZL201580062938.9	07/20/2021
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films With Control Of Light Hue Using Nanoscale Colorants	Hong Kong	18101955.1 1242722A	02-08-2018 06-29-2018	HK1242722	03/11/2022
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films With Control Of Light Hue Using Nanoscale Colorants	Japan	2017-520512 2017-539047	10-15-15 12-28-2017	6755244	08-27-2020
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films With Control Of Light Hue Using Nanoscale Colorants	Japan	2020-072935 2020-125483	04-15-2020 08-20-2020	7145906	09/22/2022
Xiqiang Yang, Yadong Cao, Yongxing Hu, Hua Gu, Ying-Syi Li, and Ajay Virkar	14	Transparent Films With Control Of Light Hue Using Nanoscale Colorants	Korea	10-2017-7013238	10-15-15	10-2510164	03/10/2023

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Transparent Conductive Film	USA	14/823,001 2016-0293288 A1	08/11/2015 10/06/2016	9,530,534	12/27/2016
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods For Performing The Coating (DIV)	USA	15/354,733 2017-0067166 A1	11/17/2016 03/09/2017	11,668,010	06/06/2023
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods For Performing The Coating	USA	18/119,350	03/09/2023		
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	Taiwan	105110634 201642280	4/1/2016 12-1-2016	T223014	04/01/2021
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	Taiwan	110106362 202136042	02-23-2021 10-01-2021		
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	Taiwan	111140220 202311030	10-24-2022 03-16-2023		
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Marko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	China	201680027045.5 CN107851973A	03/29/2016 03/27/2018	ZL201680027045.5	04/05/2022

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Mariko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	Japan	2017-551648 2018-514060	03/29/2016 05-31-2018	6752217	08-20-2020
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Mariko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	Japan	2020-138079 2020-190034	08-18-2020 11-26-2020	7137862	09/07/2022
Yongxing Hu, Xiqiang Yang, Ying-Syi Li, Alexander Seung-il Hong, Melanie Mariko Inouye, Yadong Cao, Ajay Vitkar	18	Noble Metal Coated Silver Nanowires, Methods for Performing the Coating and Stabilized Transparent Conductive Films	Korea	10-2017-7031916	03/29/2016		
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Vitkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	Taiwan	105140805 201730374	12-09-2016 09-01-2017	I733720	07/21/2021
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Vitkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	USA	14/963,974 2017/0169911 A1	12/9/2015 06-15-2017	10,147,512	12-04-2018

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	USA	16/174,433 2019-0066863 A1	10-30-2018 02-28-2019	10,902,965	01-26-2021
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	USA	17/132,327	12-23-2020	11,498,129	11/15/2022
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	China	201680077547.9 CN108699284A	12/02/2016 10/23/2018	ZL201680077547.9	11/23/2021
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	China	202111313319.6 CN 114255906	11-08-2021 03-29-2022		
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	Japan	2018-530051	12/02/2016	7153922	10/06/2022

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	Japan	2022-091525 2022-119983	06-06-2022 08-17-2022		
Yongxing Hu, Alexander Seung-il Hong, Ying-Syi Li, Xiqiang Yang, Yadong Cao, Ajay Virkar	19	Methods For Synthesizing Silver Nanoplates And Nobel Metal Coated Silver Nanoplates And Their Use In Transparent Films For Control Of Light Hue	Korea	10-2018-7019511	12/02/2016		
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20 ⁴	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	Taiwan	106134739	10/11/2017	T755431	02/21/2022
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilization Hardcoat Precursor Solution	Taiwan	111101935	01-18-2022		
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	USA	15/730,053 2018-0105704 A1	10-11-2017 04-19-2018		
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	China	201780063445.6 CN109804439	10-11-2017 05-24-2019	ZL201780063445.6	02/11/2022

⁴ Patent Family/Assignment Number 22 is part of Number 20.

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	Hong Kong	19132270.0 HK40008989	11-15-2019 06-19-2020	HK40008989	11/18/2022
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	China	202210088889.8 CN114395293A	1-25-2022 04-26-2022	ZL202210088889.8.	07/04/2023
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	EPO	17861111.7 3526801	10-11-2017 08-21-2019	3526801	12/07/2022
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	Japan	2019-520156 2019-537820	10-11-2017 12-26-2019	7041674	03/15/2022
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	Japan	2022-007355 2022-062085	01-20-2022 04-19-2022		
Xiqiang Yang, Yongxing Hu, Ajay Virkar, Arthur Yung-Chi Cheng, Faraz Azadi Manzour, Ying-Syi Li	20	Stabilized Sparse Metal Conductive Films And Solutions For Delivery Of Stabilizing Compounds	Korea	10-2019-7011179	10-11-2017	10-2502830	02/20/2023
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jinh Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires (claims benefit)	USA	15/951,758 2019-0172600	04-12-2018 06-06-2019	10,714,230	07-14-2020

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jinh Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires (Div.)	USA	16/249,249 2019-0172602	01-16-2019 06-06-2019	10,438,714	10-08-2019
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jinh Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires (Cont.)	USA	16/549,204 2019-0378633	08-23-2019 12-12-2019	11,037,694	06/15/2021
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jinh Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires (Cont.)	USA	17/316,876 2021-0265073	05/11/2021 08/26/2021		
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jinh Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Taiwan	107143804 TW201925487A	12-06-2018 07-01-2019	1686487	03-1-2020
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jinh Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Taiwan	108136063	10-04-2019	1754841	02/11/2022

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Taiwan	110111673	03-30-2021	I756091	02-21-2022
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Collection of Nanowires	Taiwan	111101310	01-12-2022		
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	China	201880086347.9 CN111602209A	12-05-2018 08-28-2020	ZL201880086347.9	04-15-2022
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	China	202111036907.X CN 113744917 A	09-06-2021 12-03-2021		
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	China	202210312480.X CN114596978A	03-28-2022 06-07-2022		
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	EPO	18886188.4	12-05-2018		

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Japan	2020-531147	12-05-2018	7224056	02/09/2023
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Japan	2022-161823 2022-188220	10-06-2022 12-20-2022		
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Korea	10-2020-7019236 10-2020-0090899A	12-05-2018 07-29-2020	10-2480158	12/19/2022
Yongxing Hu, Ying-Syi Li, Xiqiang Yang, Jing Shun Ang, Ajay Virkar	24	Thin And Uniform Silver Nanowires, Method Of Synthesis And Transparent Conductive Films Formed From The Nanowires	Korea	10-2022-7044342 10-2023-0003391A	12-16-2022 01-05-2023		
Xiqiang Yang, Yadong Cao, Ajay Virkar	26	Silver-Based Transparent Conductive Layers Interfaced With Copper Traces and Methods For Forming The Structures	USA	17/570,571 2022-0132672	01-07-2022 04-22-2022		

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Xiaofeng Chen, Byunglwan Kang, Jackie Chen, Yadong Cao, Vicki Luo, Arthur Yung-Chi Cheng, Andrew Hyeongio Moon, Xiqiang Yang, Ajay Virkar	28	Thin Flexible Structure With Surfaces With Transparent Conductive Films And Processes For Forming The Structures	USA	16/259,302 2020-0245457	01-28-2019 07-30-2020		
Xiaofeng Chen, Byunglwan Kang, Jackie Chen, Yadong Cao, Vicki Luo, Arthur Yung-Chi Cheng, Andrew Hyeongio Moon, Xiqiang Yang, Ajay Virkar	28	Thin Flexible Structure With Surfaces With Transparent Conductive Films And Processes For Forming The Structures	Taiwan	109102669 202106818	01-22-2020 02-16-2021		
Xiaofeng Chen, Byunglwan Kang, Jackie Chen, Yadong Cao, Vicki Luo, Arthur Yung-Chi Cheng, Andrew Hyeongio Moon, Xiqiang Yang, Ajay Virkar	28	Thin Flexible Structure With Surfaces With Transparent Conductive Films And Processes For Forming The Structures	Taiwan	111117014 202231795	05-05-2022 08-16-2022	I802397	05-11-2023
Xiaofeng Chen, Byunglwan Kang, Jackie Chen, Yadong Cao, Vicki Luo, Arthur Yung-Chi Cheng, Andrew Hyeongio Moon, Xiqiang Yang, Ajay Virkar	28	Thin Flexible Structure With Surfaces With Transparent Conductive Films And Processes For Forming The Structures	China	202080011393.X CN 113383298 A	01-27-2020 09-10-2021		
Xiaofeng Chen, Byunglwan Kang, Jackie Chen, Yadong Cao, Vicki Luo, Arthur Yung-Chi Cheng, Andrew Hyeongio Moon, Xiqiang Yang, Ajay Virkar	28	Thin Flexible Structure With Surfaces With Transparent Conductive Films And Processes For Forming The Structures	Europe	20748527.7 3918454	01-27-2020 12-8-2021		

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
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Xiaofeng Chen, Byunglwan Kang, Jackie Chen, Yadong Cao, Vicki Luo, Arthur Yung-Chi Cheng, Andrew Hyeongjoo Moon, Xiqiang Yang, Ajay Virkar	28	Thin Flexible Structure With Surfaces With Transparent Conductive Films And Processes For Forming The Structures	Korea	10-2021-7027552 10-2021-0118179	01-27-2020 09-29-2021		
Xiqiang Yang, Ajay Virkar	30	Coatings And Processing Of Transparent Conductive Films For Stabilization Of Sparse Metal Conductive Layers	USA	16/950,246 2021-0145911	11/17/2020 05/20/2021		
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Xiqiang Yang, Ajay Virkar	30	Coatings And Processing Of Transparent Conductive Films For Stabilization Of Sparse Metal Conductive Layers	Europe	20890109.0 4062429	11-17-2020 02-28-2023		

Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Xiqiang Yang, Ajay Virkar	30	Coatings And Processing Of Transparent Conductive Films For Stabilization Of Sparse Metal Conductive Layers	Japan	2022-528639 2023-502112	11-17-2020 1-20-2023		
Xiqiang Yang, Ajay Virkar	30	Coatings And Processing Of Transparent Conductive Films For Stabilization Of Sparse Metal Conductive Layers	Korea	10-2022-7019964 10-2022-0097516 A	11-17-2020 07-07-2022		
Faraz Azadi Manzour, Alexander Seung-il Hong, Salman Mansoor Farooqui, Xiqiang Yang, Ajay Virkar	31	Transparent Polymer Hardcoats With Antimicrobial Efficacy (Prov)	USA	17/390,060 2022-0033601	07/30/2021 02/03/2022		
Xiqiang Yang, Arthur Yung-Chi Cheng, Michael Fang, Pei-Kang Liu, Ajay Virkar	34	Formation of Electrically Conductive Layers at Room Temperature Using Silver Nanoparticulate Processing and Inks for Forming the Layers	Taiwan	112123301	06-21-2023		
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Xiqiang Yang, Arthur Yung-Chi Cheng, Michael Fang, Peikang Liu, Ajay Virkar	34	Formation of Electrically Conductive Layers at Room Temperature Using Silver Nanoparticulate Processing and Inks for Forming the Layers	PCT	PCT/US2023/025838	06-21-2023		

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Inventors	Patent Family / Assignment Number	Patent	Jurisdiction	App. No. / Publication No.	App. Date / Publ'n Date	Patent No.	Issued Date
Ajay Virkar, Xiqiang Yang, Nazim Uddin, Peikang Liu	37	Silver Nanowire And Noble-Metal Coated Silver Nanowire Conductive Polymer Composites With Low Loading Percolation Conduction	USA	63/414,143	10-07-2022		
Xiaofeng Chen, Michael Fang, Yadong Cao, Alexander Seung-il Hong, Xiqiang Yang	38	Stable Thin Film Heaters Based On Noble Metal Coated Silver Nanowires And Applications Thereof	USA	63/441,656	01-27-2023		
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Ajay Virkar, Xiqiang Yang, Amir Tork, Nazim Uddin, Xinxing Liu, Jiteng Xu, Ying-Syi Li, Alexander Seung-il Hong	40	High Loadings Of Silver Nanowires: Dispersions And Conductive Pastes; And Corresponding Methods	USA	63/459,495	04-14-2023		

Abandoned Patent Applications Co-Assigned to Nissha Printing Company, Limited
The patent applications in this list were filed under a Joint Development Agreement and were later abandoned by mutual consent of Nissha and C3 Nano based on a lack of commercial interest in the covered subject matter.

1. Taiwan 104135646, abandoned 2018
2. U.S. 2016/0122562 A, abandoned 2018
3. WO2016069438, abandoned 2017

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