

<b>PATENT ASSIGNMENT COVER SHEET</b>
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Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT6526225

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
BHUSHAN ZOPE	09/04/2018
KIRAN SHRESTHA	08/21/2018
SHANKAR SWAMINATHAN	09/06/2018
CHIYU ZHU	10/21/2020
HENRI TUOMAS ANTERO JUSSILA	08/22/2018
QI XIE	08/21/2018
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	ASM IP HOLDING B.V.
<b>Street Address:</b>	VERSTERKERSTRAAT 8
<b>City:</b>	ALMERE
<b>State/Country:</b>	NETHERLANDS
<b>Postal Code:</b>	1322 AP
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	17151435
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(602)382-6070
<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>	
<b>Phone:</b>	(602) 382-6000
<b>Email:</b>	ipdocket@swlaw.com
<b>Correspondent Name:</b>	SNELL & WILMER L.L.P.
<b>Address Line 1:</b>	400 EAST VAN BUREN STREET, SUITE 1900
<b>Address Line 2:</b>	ONE ARIZONA CENTER
<b>Address Line 4:</b>	PHOENIX, ARIZONA 85004-2202
<b>ATTORNEY DOCKET NUMBER:</b>	81048.11717
<b>NAME OF SUBMITTER:</b>	ROBERT A. CLARKE
<b>SIGNATURE:</b>	/Robert A. Clarke/
<b>DATE SIGNED:</b>	02/01/2021

**Total Attachments: 10**

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**UNITED STATES PATENT AND TRADEMARK OFFICE**

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND  
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

NOVEMBER 10, 2020

PTAS

PATRICK LEE  
3440 E. UNIVERSITY DRIVE  
PHOENIX, AZ 85034

**506343331**

UNITED STATES PATENT AND TRADEMARK OFFICE  
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT RECORDATION BRANCH OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE ASSIGNMENT RECORDATION BRANCH AT 571-272-3350. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, MAIL STOP: ASSIGNMENT RECORDATION BRANCH, P.O. BOX 1450, ALEXANDRIA, VA 22313.

RECORDATION DATE: 11/07/2020

REEL/FRAME: 054306/0355  
NUMBER OF PAGES: 9

BRIEF: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

DOCKET NUMBER: PAT-AM-0896-US-NP

ASSIGNOR:

BHUSHAN, ZOPE

DOC DATE: 09/04/2018

ASSIGNOR:

SHRESTHA, KIRAN

DOC DATE: 08/21/2018

ASSIGNOR:

SWAMINATHAN, SHANKAR

DOC DATE: 09/06/2018

ASSIGNOR:

ZHU, CHIYU

DOC DATE: 10/21/2020

ASSIGNOR:

JUSSILA, HENRI TUOMAS ANTERO

DOC DATE: 08/22/2018

ASSIGNOR:

XIE, QI

DOC DATE: 08/21/2018

ASSIGNEE:

ASM IP HOLDING B.V.  
VERSTERKERSTRAAT 8  
ALMERE, NETHERLANDS 1322 AP

APPLICATION NUMBER: 16105802

FILING DATE: 08/20/2018

PATENT NUMBER:

ISSUE DATE:

TITLE: METHODS FOR DEPOSITING A MOLYBDENUM METAL FILM OVER A DIELECTRIC  
SURFACE OF A SUBSTRATE BY A CYCLICAL DEPOSITION PROCESS AND  
RELATED SEMICONDUCTOR DEVICE STRUCTURES

ASSIGNMENT RECORDATION BRANCH  
PUBLIC RECORDS DIVISION

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT6390085

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
ZOPE BHUSHAN	09/04/2018
KIRAN SHRESTHA	08/21/2018
SHANKAR SWAMINATHAN	09/06/2018
CHIYU ZHU	10/21/2020
HENRI TUOMAS ANTERO JUSSILA	08/22/2018
QI XIE	08/21/2018
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	ASM IP HOLDING B.V.
<b>Street Address:</b>	VERSTERKERSTRAAT 8
<b>City:</b>	ALMERE
<b>State/Country:</b>	NETHERLANDS
<b>Postal Code:</b>	1322 AP
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
Application Number:	16105802
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(602)470-2434
<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>	
<b>Phone:</b>	6024705707
<b>Email:</b>	michelle.simpson@asm.com
<b>Correspondent Name:</b>	PATRICK LEE
<b>Address Line 1:</b>	3440 E. UNIVERSITY DRIVE
<b>Address Line 4:</b>	PHOENIX, ARIZONA 85034
<b>ATTORNEY DOCKET NUMBER:</b>	PAT-AM-0896-US-NP
<b>NAME OF SUBMITTER:</b>	MICHELLE SYMPSON
<b>SIGNATURE:</b>	/Michelle Simpson/
<b>DATE SIGNED:</b>	11/07/2020
<b>Total Attachments: 7</b>	

Application Serial No.: 16/105,802

Docket No.: PAT-AM-0896-US-NP

Filing Date: August 20, 2018

Title: METHODS FOR DEPOSITING A MOLYBDENUM METAL FILM OVER A DIELECTRIC SURFACE OF A SUBSTRATE BY A CYCLICAL DEPOSITION PROCESS AND RELATED SEMICONDUCTOR DEVICE STRUCTURES

### **ASSIGNMENT**

WHEREAS, BHUSHAN ZOPE, a citizen of India and a resident of Phoenix, Arizona; KIRAN SHRESTHA, a citizen of Nepal and a resident of Tempe, Arizona; SHANKAR SWAMINATHAN, a citizen of India and a resident of Phoenix, Arizona; CHIYU ZHU, a citizen of China and a resident of Helsinki, Finland; HENRI TUOMAS ANTERO JUSSILA, a citizen of Finland and a resident of Espoo, Finland; and QI XIE, a citizen of Belgium and a resident of Leuven, Belgium;

(collectively, “WE” or “ASSIGNOR”) have conceived of one or more processes, methods, machines, articles of manufacture, designs, compositions of matter, inventions, discoveries or new or useful improvements relating to METHODS FOR DEPOSITING A MOLYBDENUM METAL FILM OVER A DIELECTRIC SURFACE OF A SUBSTRATE BY A CYCLICAL DEPOSITION PROCESS AND RELATED SEMICONDUCTOR DEVICE STRUCTURES (collectively, the “INVENTIONS”) for which WE have executed and/or may execute one or more patent applications therefore; and

WHEREAS, ASM IP HOLDING B.V. (hereinafter “ASSIGNEE”), a corporation having a place of business at Versterkerstaat 8, Almere, 1322 AP, Netherlands, desires to acquire or otherwise obtain the entire right, title, and interest in and to said INVENTIONS, including all patent applications therefore, and all patents that have granted or may be granted hereafter thereon, including, but not limited to, those identified below.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged, WE do hereby acknowledge that WE have sold, assigned, conveyed and transferred, and by these presents do hereby sell, assign, convey and transfer, unto ASSIGNEE, its successors, its legal representatives and its assigns, the entire right, title, and interest throughout the world in and to said INVENTIONS, including all patent applications therefore that may have been filed or may be filed hereafter for said INVENTIONS (including but not limited Application No(s). 16/105,802, filed on August 20, 2018, as Docket No. PAT-AM-0896-US-NP (and do hereby authorize ASSIGNEE and its representative to hereafter add herein such application number(s) and/or filing date(s) when known)) and all rights of priority under International Conventions, Treaties, and Agreements, all utility applications, national phase applications, utility model applications, divisional applications, renewal applications, continuation applications, continuation-in-part applications, patent of addition applications, confirmation applications, validation applications and design applications thereof,

and all issued patents which may have granted or may be granted hereafter thereon and all reissues, renewals, reexaminations, and extensions to any of the foregoing and all patents issuing thereon;

AND WE DO HEREBY authorize and request any Official of any country or countries whose duty it is to issue patents on applications or registrations, to issue all patents for said INVENTIONS to ASSIGNEE, its successors, its legal representatives, and its assigns, in accordance with the terms of this instrument;

AND WE DO HEREBY sell, assign, transfer, and convey to said ASSIGNEE, its successors, its legal representatives, and its assigns all claims for damages and all remedies arising out of or relating to any violation(s) of any of the rights assigned hereby that have or may have accrued prior to the date of assignment to said ASSIGNEE, or may accrue hereafter, including, but not limited to the right to sue for, seek, obtain, collect, recover and retain damages and any ongoing or prospective royalties to which WE may be entitled, or form any settlement or agreement related to any of said patents before or after issuance;

AND WE HEREBY covenant and agree that WE will communicate promptly to said ASSIGNEE, its successors, its legal representatives, and its assigns, any facts known to us respecting said INVENTIONS, and will testify in any legal proceeding, sign all lawful papers, execute all applications and certificates, make all rightful declarations and/or oaths, and provide all lawful assistance to said ASSIGNEE, its successors, its legal representatives, and its assigns, to obtain and enforce patent protection for said INVENTIONS in all countries.

EXECUTED as of the date(s) below by ASSIGNOR:

ZOPE BHUSHAN

B. Zope  
Signature

9/4/18  
Date

KIRAN SHRESTHA

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

SHANKAR SWAMINATHAN

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

CHIYU ZHU

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

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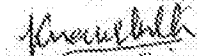
EXECUTED as of the date(s) below by ASSIGNOR:

ZOPE BHUSHAN

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

KIRAN SHRESTHA



08-21-2018

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

SHANKAR SWAMINATHAN

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

CHIYU ZHU

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



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EXECUTED as of the date(s) below by ASSIGNOR:

ZOPE BHUSHAN

\_\_\_\_\_  
Signature

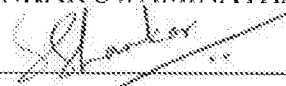
\_\_\_\_\_  
Date

KIRAN SHRESTHA

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

SHANKAR SWAMINATHAN

  
\_\_\_\_\_  
Signature

9/6/2018  
Date

CHIYU ZHU

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

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EXECUTED as of the date(s) below by ASSIGNOR:

ZOPE BHUSHAN

\_\_\_\_\_  
Signature Date

KIRAN SHRESTHA

\_\_\_\_\_  
Signature Date

SHANKAR SWAMINATHAN

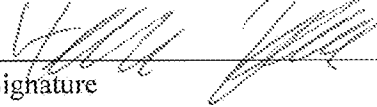
\_\_\_\_\_  
Signature Date

CHIYU ZHU

*Chiyu Zhu* \_\_\_\_\_  
Signature Date

*Oct 21 2020*

HENRI TUOMAS ANTERO JUSSILA

  
Signature

22.8.2018  
Date

QI XIE

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

HENRI TUOMAS ANTERO JUSSILA

\_\_\_\_\_  
Signature

QI XIE

*Qi Xie*  
\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

*August 21, 2018*  
\_\_\_\_\_  
Date