

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT5179477

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
PETER L. KELLERMAN	10/08/2018
BRIAN D. KERNAN	10/04/2018
FREDERICK M. CHARLSON	09/10/2018
DAWEI SUN	10/04/2018
DAVID MORRELL	09/09/2018
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	VARIAN SEMICONDUCTOR EQUIPMENT ASSOCIATES, INC.
<b>Street Address:</b>	35 DORY ROAD
<b>City:</b>	GLOUCESTER
<b>State/Country:</b>	MASSACHUSETTS
<b>Postal Code:</b>	01930
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
Application Number:	15455437
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(919)999-2798
<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>	919-636-4767
<b>Email:</b>	bjackson@kdbfirm.com
<b>Correspondent Name:</b>	KACVINSKY DAISAK BLUNI PLLC
<b>Address Line 1:</b>	101 CARNEGIE CENTER SUITE 106
<b>Address Line 4:</b>	PRINCETON, NEW JERSEY 08540
<b>ATTORNEY DOCKET NUMBER:</b>	024497
<b>NAME OF SUBMITTER:</b>	BARBARA J. JACKSON
<b>SIGNATURE:</b>	/Barbara J. Jackson/
<b>DATE SIGNED:</b>	10/09/2018
<b>Total Attachments: 10</b> source=024497_Assignment#page1.tif	

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**ASSIGNMENT**

**WHEREAS**, the undersigned, to wit:

Peter L. Kellerman  
Brian D. Kernan  
Frederick M. Carlson  
Dawei Sun  
David Morrell

(Hereinafter collectively **ASSIGNOR**), have/has made a certain new and useful invention as set forth in an application for United States Letters Patent, entitled:

**APPARATUS AND METHOD FOR CRYSTALLINE SHEET GROWTH**

(X only one):

- (A)  which was executed concurrently herewith and is being filed herewith in the United States Patent and Trademark Office;
- (B)  which was executed on \_\_\_\_\_, 20\_\_\_\_, and is being filed herewith in the United States Patent and Trademark Office;
- (C)  which was filed as U.S. Patent Application No. 15/455,437, filed on March 10, 2017

**AND WHEREAS**, **VARIAN SEMICONDUCTOR EQUIPMENT ASSOCIATES, INC.**, (hereinafter **ASSIGNEE**), a corporation organized and existing under the laws of the state of Delaware, and having its principal place of business at 35 Dory Road, Gloucester, Massachusetts, 01930, is desirous of acquiring the entire right, title, and interest in and to said invention and any and all patents that may be obtained therefor, and in and to said application and any and all patents that may issue therefrom;

**NOW, THEREFORE**, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, **ASSIGNOR** does hereby sell, assign, transfer, and set over unto said **ASSIGNEE**, its successors, assigns, and legal representatives, all right, title, and interest in and to said invention throughout the world, and any and all patents of the United States and foreign countries that may be obtained therefor, and in and to said application, including any and all continuations, continuations-in-part, divisionals, reissues, re-examinations, substitutions, and extensions thereof, and any and all patents of the United States and foreign countries that may issue therefrom, such right, title, and interest including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in the name of said **ASSIGNEE**, its successors, assigns, and legal representatives throughout the world, including all rights of priority, all rights to publish cautionary notices reserving ownership of said invention, and all rights to register said invention in appropriate registries;

**ASSIGNOR** also does hereby covenant that it has the full right to convey the entire right, title, and interest herein assigned, and that it has not and will not execute any agreement in conflict herewith;

**ASSIGNOR** also does hereby authorize and request the Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States on said invention or resulting from said application, including any continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions thereof, to said **ASSIGNEE**, its successors, assigns, and legal representatives as the **ASSIGNEE** of the entire right, title, and interest herein assigned;

**ASSIGNOR** also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said **ASSIGNEE**, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to perfect the entire right, title, and interest here assigned in said **ASSIGNEE**, its successors, assigns, and legal representatives, and generally do everything possible to vest the entire right, title and interest herein assigned in said **ASSIGNEE**, its successors, assigns, and legal representatives;

**ASSIGNOR** also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said **ASSIGNEE**, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to make application for and obtain any and all continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions of said application, or any application on said invention, or any patent issuing therefor or therefrom;

**ASSIGNOR** also does hereby agree to, at any time, upon request, without further or additional consideration but at the expense of said **ASSIGNEE**, its successors, assigns, and legal representatives, communicate to said **ASSIGNEE**, its successors, assigns, and legal representatives, any known facts relating to said invention or said application or any patent issuing therefor or therefrom, and testify as to the same in any interference or other litigation proceeding when requested to do so, and aid said **ASSIGNEE**, its successors, assigns, and legal representatives, in obtaining and enforcing property protection for said invention in all countries;

**ASSIGNOR** also does hereby grant the Legal Department of Varian Semiconductor Equipment Associates, Inc., at the address shown above, the power to insert on this assignment any further information, including, but not limited to application number(s) and filing date(s), which may be necessary or desirable in order to comply with any rule or request of the United States Patent and Trademark Office for the purposes of recording this document.

**ASSIGNOR** also does now hereby execute this document on the date(s) indicated below:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Name: Peter L. Kellerman

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Peter L. Kellerman, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_ day of \_\_\_\_\_, 2017.

My Commission Expires:

\_\_\_\_\_  
Notary Public

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 4 day of Oct, 2017. 2018

  
\_\_\_\_\_  
Name: Brian D. Kernan

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Brian D. Kernan, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_ day of \_\_\_\_\_, 2017.

My Commission Expires:

\_\_\_\_\_  
Notary Public

I have hereunto set my hand and seal this 10<sup>th</sup> day of SEPTEMBER, 2017. 8

Frederick M. Carlson  
Name: Frederick M. Carlson

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

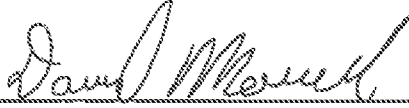
\_\_\_\_\_  
Name: Dawei Sun

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Dawei Sun, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 9<sup>th</sup> day of SEPTEMBER  
2017. §



Name: David Morrell

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named David Morrell, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

.....  
Notary Public

My Commission Expires:

**ASSIGNMENT**

**WHEREAS**, the undersigned, to wit:

Peter L. Kellerman  
Brian D. Kernan  
Frederick M. Carlson  
Dawei Sun  
David Morrell

(Hereinafter collectively **ASSIGNOR**), have/has made a certain new and useful invention as set forth in an application for United States Letters Patent, entitled:

**APPARATUS AND METHOD FOR CRYSTALLINE SHEET GROWTH**

(X only one):

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- (B)  which was executed on \_\_\_\_\_, 20\_\_\_, and is being filed herewith in the United States Patent and Trademark Office;
- (C)  which was filed as U.S. Patent Application No. 15/455,437, filed on March 10, 2017

**AND WHEREAS**, VARIAN SEMICONDUCTOR EQUIPMENT ASSOCIATES, INC., (hereinafter **ASSIGNEE**), a corporation organized and existing under the laws of the state of Delaware, and having its principal place of business at 35 Dory Road, Gloucester, Massachusetts, 01930, is desirous of acquiring the entire right, title, and interest in and to said invention and any and all patents that may be obtained therefore, and in and to said application and any and all patents that may issue therefrom;

**NOW, THEREFORE**, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, **ASSIGNOR** does hereby sell, assign, transfer, and set over unto said **ASSIGNEE**, its successors, assigns, and legal representatives, all right, title, and interest in and to said invention throughout the world, and any and all patents of the United States and foreign countries that may be obtained therefor, and in and to said application, including any and all continuations, continuations-in-part, divisionals, reissues, re-examinations, substitutions, and extensions thereof, and any and all patents of the United States and foreign countries that may issue therefrom, such right, title, and interest including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in the name of said **ASSIGNEE**, its successors, assigns, and legal representatives throughout the world, including all rights of priority, all rights to publish cautionary notices reserving ownership of said invention, and all rights to register said invention in appropriate registries;

**ASSIGNOR** also does hereby covenant that it has the full right to convey the entire right, title, and interest herein assigned, and that it has not and will not execute any agreement in conflict herewith;



**ASSIGNOR** also does hereby authorize and request the Commissioner of Patents and Trademarks to issue any and all Letters Patent of the United States on said invention or resulting from said application, including any continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions thereof, to said **ASSIGNEE**, its successors, assigns, and legal representatives as the **ASSIGNEE** of the entire right, title, and interest herein assigned;

**ASSIGNOR** also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said **ASSIGNEE**, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to perfect the entire right, title, and interest here assigned in said **ASSIGNEE**, its successors, assigns, and legal representatives, and generally do everything possible to vest the entire right, title and interest herein assigned in said **ASSIGNEE**, its successors, assigns, and legal representatives;


**ASSIGNOR** also does hereby agree to, at any time, upon request, without further or additional consideration, but at the expense of said **ASSIGNEE**, its successors, assigns, or legal representatives, execute and deliver any and all papers, make all rightful oaths, and do all lawful acts that may be necessary or desirable to make application for and obtain any and all continuations, continuations-in-part, divisions, reissues, re-examinations, substitutions, and extensions of said application, or any application on said invention, or any patent issuing therefor or therefrom;

**ASSIGNOR** also does hereby agree to, at any time, upon request, without further or additional consideration but at the expense of said **ASSIGNEE**, its successors, assigns, and legal representatives, communicate to said **ASSIGNEE**, its successors, assigns, and legal representatives, any known facts relating to said invention or said application or any patent issuing therefor or therefrom, and testify as to the same in any interference or other litigation proceeding when requested to do so, and aid said **ASSIGNEE**, its successors, assigns, and legal representatives, in obtaining and enforcing property protection for said invention in all countries;

**ASSIGNOR** also does hereby grant the Legal Department of Varian Semiconductor Equipment Associates, Inc., at the address shown above, the power to insert on this assignment any further information, including, but not limited to application number(s) and filing date(s), which may be necessary or desirable in order to comply with any rule or request of the United States Patent and Trademark Office for the purposes of recording this document.

**ASSIGNOR** also does now hereby execute this document on the date(s) indicated below:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 8 day of Oct,  
2017. 2018

  
Name: Peter L. Kellerman

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Peter L. Kellerman, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Notary Public My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_ day of \_\_\_\_\_,  
2017.

\_\_\_\_\_  
Name: Brian D. Kernan

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**


Before me, a Notary Public did personally appear the above-named Brian D. Kernan, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Notary Public My Commission Expires:

I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Name: Frederick M. Carlson

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

  
\_\_\_\_\_  
Name: Dawei Sun

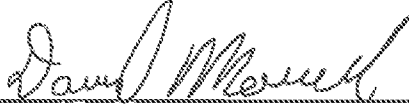
**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named Dawei Sun, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Notary Public

My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 9<sup>th</sup> day of SEPTEMBER  
2017. §



Name: David Morrell

**COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX**

Before me, a Notary Public did personally appear the above-named David Morrell, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

.....  
Notary Public

My Commission Expires: