

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

EPAS ID: PAT3703049

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
RAJESH PRASAD	01/19/2016
STEVEN ROBERT SHERMAN	01/14/2016
ANDREW M. WAITE	01/18/2016
SUNGHO JO	01/15/2016
KYU-HA SHIM	01/15/2016
GUY OTERI	01/15/2016
SOMCHINTANA NORASETTHEKUL	01/15/2016
<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>
<b>Application Number:</b>	14975968
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(508)898-2020
<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>	5058981818
<b>Email:</b>	rob.frame@iplawboutique.com
<b>Correspondent Name:</b>	NIELDS, LEMACK & FRAME, LLC
<b>Address Line 1:</b>	176 E. MAIN STREET
<b>Address Line 2:</b>	SUITE 5
<b>Address Line 4:</b>	WESTBORO, MASSACHUSETTS 01581
<b>ATTORNEY DOCKET NUMBER:</b>	023504USA
<b>NAME OF SUBMITTER:</b>	ROBERT C. FRAME
<b>SIGNATURE:</b>	/Robert C. Frame/
<b>DATE SIGNED:</b>	01/20/2016

PATENT

**Total Attachments: 8**

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ASSIGNMENT

WHEREAS, the undersigned, to wit:

Rajesh Prasad, residing at 76 Hill Street, Lexington, Massachusetts 02421  
Steven Robert Sherman, 409 Newtonville Avenue, Newton, MA 02460  
Andrew M. Waite, residing at 50 New Balch Street, Beverly, MA 01915  
Sungho Jo, 86 Risley Road, Chestnut Hill, MA 02467  
Kyu-Ha Shim, 3 Carriage Hill Road, Andover, MA 01810  
Guy Oteri, 20 Mill Street, Merrimac, MA 01860  
Somchintana Norasetthekul, 56 Woodcrest Road, Boxford, MA 01921

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

**Etch Rate Modulation Through Ion Implantation**

(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 US Patent Appln. No 14/975,968 filed on December 21, 2015

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 therefrom, 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 therefrom, 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 19 day of January, 2016.

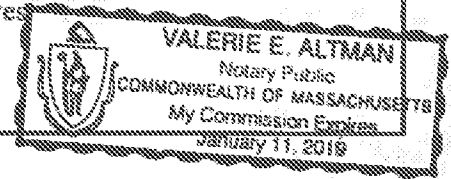
Rajesh Prasad  
Name: Rajesh Prasad

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named **Rajesh Prasad**, 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 19<sup>th</sup> day of January, 2016.

Valerie E. Altman  
Notary Public

My Commission Expires:



IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Steven Robert Sherman

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named **Steven Robert Sherman**, 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 \_\_\_\_\_, 2016.

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

My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

Name: Rajesh Prasad

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named **Rajesh Prasad**, 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 \_\_\_\_\_, 2016.

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

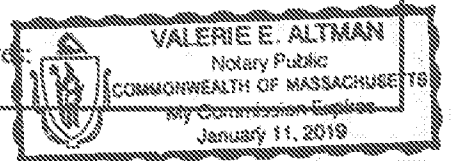
IN WITNESS WHEREOF, I have hereunto set my hand and seal this 14 day of January, 2016.

Steven Robert Sherman  
Name: Steven Robert Sherman

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named **Steven Robert Sherman**, 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 14<sup>th</sup> day of January, 2016.

Valerie E. Altman  
Notary Public My Commission Expires:



IN WITNESS WHEREOF, I have hereunto set my hand and seal this 18<sup>th</sup> day of JANUARY, 2016.

A.M. Waite

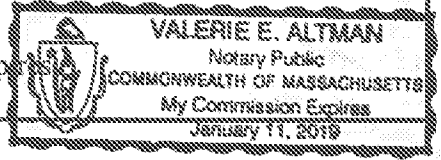
Name: Andrew M. Waite

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Andrew M. Waite, 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 18<sup>th</sup> day of January, 2016.

Valerie E. Altman  
Notary Public

My Commission Expires



IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

Name: Sungho Jo

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Sungho Jo, 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 \_\_\_\_\_, 2016.

Notary Public

My Commission Expires:

IN WITNESS WHEREOF, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Name: Andrew M. Waite

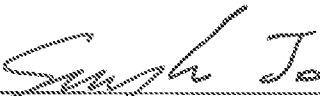
COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Andrew M. Waite, 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 \_\_\_\_\_, 2016.

My Commission Expires:

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

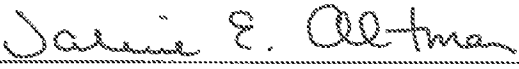
IN WITNESS WHEREOF, I have hereunto set my hand and seal this 15 day of JAN., 2016.

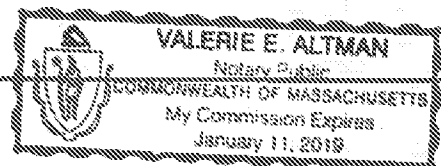
  
\_\_\_\_\_  
Name: Sungho Jo

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Sungho Jo, 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 15<sup>th</sup> day of January, 2016.


My Commission Expires:

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



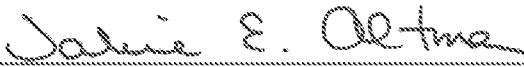


IN WITNESS WHEREOF, I have hereunto set my hand and seal this 15 day of January, 2016.

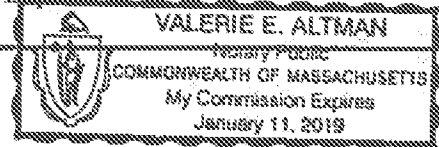
  
Name: Kyu-Ha Shim

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Kyu-Ha Shim, 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 15<sup>th</sup> day of January, 2016.

  
Notary Public

My Commission Expires:



IN WITNESS WHEREOF, I have hereunto set my hand and seal this 15 day of January, 2016.

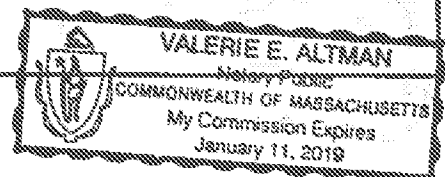
  
Name: Guy Oteri

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

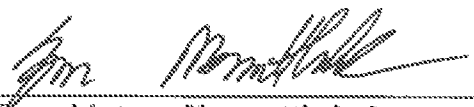
Before me, a Notary Public did personally appear the above-named Timothy J. Miller, personally known to me and/or proved to me on the basis of satisfactory evidence to be the person who signed and sealed the foregoing instrument and acknowledged the same to be his or her own free act and deed, this 15<sup>th</sup> day of January, 2016.

  
Notary Public

My Commission Expires:

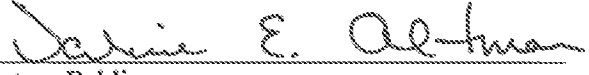


IN WITNESS WHEREOF, I have hereunto set my hand and seal this 15 day of January, 2016.

  
Name: Somchintana Norasetthekul,

COMMONWEALTH/STATE OF MASSACHUSETTS  
COUNTY OF ESSEX

Before me, a Notary Public did personally appear the above-named Somchintana Norasetthekul,, 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 15<sup>th</sup> day of January, 2016.

  
Notary Public

My Commission Expires:

