To the Honorable Commissioner

1. Name of conveying parties:
   Execution Date: July 10, 2000
   Moris Kori;
   Alfred W. Mak;
   Jeong Soo Byun;
   Lawrence Chung-Lai Lei;
   Hua Chung;
   Ashok Sinha; and
   Ming Xi

Additional names of conveying Parties attached? ☐Yes ☒No

3. Nature of conveyance:
   ☒ Assignment ☐ Merger
   ☐ Security Agreement ☐ Change of Name
   ☐ Other

   Execution Date: See Above

4. Application number(s) or patent number(s): 09/605,593

   If this document is being filed together with a new application the execution date of the application is: Herewith

For: BIFURCATED DEPOSITION PROCESS FOR DEPOSING REFRACTORY METAL LAYERS EMPLOYING ATOM C
   LAYER DEPOSITION AND CHEMICAL VAPOR DEPOSITION TECHNIQUES


5. Name and address of party to whom correspondence concerning
   this document should be mailed:
   Name: ROBERT W. MULCAHY
   Internal Address: Applied Materials, Inc.
   Legal Affairs Department - M/S 2061
   Street Address: P. O. Box 450A
   City: Santa Clara State: CA Zip: 95052

   Additional Number attached? ☐Yes ☒No

6. Total number of applications and patent involved:

7. Total Fee (37 CFR 3.41)
   ☒ Enclosed
   ☐ Authorized to be charged to deposit account

8. Deposit Account Number:

9. Statement and signature:

   To the best of my knowledge and belief the foregoing information is true and any attached copy is a true copy of the original document.

   Kenneth C. Brooks, Reg. No. 38,593
   Name of Person Signing

   Signature
   Date

10. Total number of pages comprising cover sheet, attachments, and document: 8

   Mail documents to be recorded with the required cover sheet information to:
   Commissioner of Patents and Trademarks, Box Assignment
   Washington, D.C. 20231
ASSIGNMENT FOR APPLICATION FOR PATENT

WHEREAS:

Names and Addresses of Inventors:

<table>
<thead>
<tr>
<th></th>
<th>Inventor Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Moris Kori</td>
<td>55 Hamilton Court, Palo Alto, California 94301</td>
</tr>
<tr>
<td>2</td>
<td>Alfred W. Mak</td>
<td>32722 Fellows Court, Union City, California 94587</td>
</tr>
<tr>
<td>3</td>
<td>Jeong Soo Byun</td>
<td>20975 Valley Green Drive #257, Cupertino, California 95014</td>
</tr>
<tr>
<td>4</td>
<td>Lawrence Chung-Lai Lei</td>
<td>1594 Country Club Drive, Milpitas, California 95035</td>
</tr>
<tr>
<td>5</td>
<td>Hua Chung</td>
<td>4645 Piper Drive, San Jose, California 95129</td>
</tr>
</tbody>
</table>

(hereinafter referred to as Assignors), have invented a certain invention entitled

**BIFURCATED DEPOSITION PROCESS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING ATOMIC LAYER DEPOSITION AND CHEMICAL VAPOR DEPOSITION TECHNIQUES**

for which application for Letters Patent in the United States was filed on _06/28/2000_ under Serial No. _09/605,593_, executed on even date herewith; and

WHEREAS, Applied Materials, Inc., a corporation of the State of Delaware, having a place of business at 3050 Bowers Avenue, Santa Clara, California 95054 (hereinafter referred to as Assignee), is desirous of acquiring the entire right, title and interest in and to said application (hereinafter referred to as the Application), and the invention disclosed therein (hereinafter referred to as the Invention), and in and to all embodiments of the Invention heretofore conceived, made or discovered by said Assignors, and in and to any and all patents inventor’s certificates and other forms of protection (hereinafter referred to as the Patents) thereon granted in any and all countries and groups of countries.

NOW, THEREFORE, in consideration of good and valuable consideration acknowledged by said Assignors to have been received in full from said Assignee:

1. Said Assignors hereby sell, assign, transfer and convey to Assignee the full and exclusive right, title and interest (a) in and to said Application and said Invention; (b) in and to all rights to apply for patents on said Invention in any and all countries pursuant to the International Convention for the Protection of Industrial Property or otherwise; (c) in and to any and all Applications filed and any and all Patents granted on said Invention in any and all countries and groups of countries, including each and every Application filed and each and every Patent granted on any application which is a division, substitution, or continuation of said Application; and (d) in and to each and every reissue or extension of any of said Patents

2. Said Assignors hereby covenant and agree to cooperate with said Assignee to enable said Assignee to enjoy to the fullest extent the right, title and interest to said Invention herein conveyed in any and all countries and groups of countries. Such cooperation by said Assignors shall include prompt production of pertinent facts and documents, giving testimony, execution of petitions, oaths, specifications, declarations or other papers, and other assistance all to the extent deemed necessary or desirable by said Assignee (a) for perfecting in said Assignee the right, title and interest herein conveyed, (b) for prosecuting any of said applications, (c) for filing and prosecuting substitute, divisional, continuing
or additional applications covering said invention; (d) for filing and prosecuting applications for reissue of any of said Patents; (e) for interference or other priority proceedings involving said Invention; and (f) for legal proceedings involving said Invention and any application therefor and any Patents granted thereon, including without limitation opposition proceedings, cancellation proceedings, priority contests, public use proceedings, infringement actions and court actions, provided, however, that the expense incurred by said Assignors in providing such cooperation shall be paid for by said Assignee.

3. The term and covenants of this agreement shall inure to the benefit of said Assignee, its successors, assigns and other legal representatives, and shall be binding upon said Assignors, their respective heirs, legal representatives and assigns.

4. Said Assignors hereby warrant and represent that they have not entered and will not enter into any assignment, contract, or understanding in conflict herewith.

5. Said Assignors hereby authorize and request the attorneys of record to insert, where indicated above, the application number and filing date of said application when known.

IN WITNESS WHEREOF, the said Assignors have executed and delivered this instrument to said Assignee on the dates indicated below.

1) July 18, 2003
   Moris Kori

2) July 15, 2003
   Alfred W. Mak

3) July 11, 2003
   Jeong Soo Byun

4) July 10, 2003
   Lawrence Chung-Chaung-Lai

5) July 10, 2003
   Hua Chung
ASSIGNMENT FOR APPLICATION FOR PATENT

WHEREAS:

Names and Addresses of Inventors:

| 1) | Ashok Sinha  
|    | 4176 Hubbratt Drive  
|    | Palo Alto, California 94306 |
| 2) | Ming Xi  
|    | 138 Beaumere Way  
|    | Milpitas, California 95035 |

(hereinafter referred to as Assignors), have invented a certain invention entitled

BIFURCATED DEPOSITION PROCESS FOR DEPOSITING REFRACTORY METAL LAYERS EMPLOYING ATOMIC LAYER DEPOSITION AND CHEMICAL VAPOR DEPOSITION TECHNIQUES

for which application for Letters Patent in the United States is filed herewith,

having serial number 09/140,593, filed on June 28, 2000 herewith.

WHEREAS, Applied Materials, Inc., a corporation of the State of Delaware, having a place of business at 3050 Bowers Avenue, Santa Clara, California 95054 (hereinafter referred to as Assignee), is desirous of acquiring the entire right, title and interest in and to said application (hereinafter referred to as the Application), and the invention disclosed therein (hereinafter referred to as the Invention), and in and to all embodiments of the invention, hereinafter conceived, made or discovered by said Assignors, and in and to any and all patents, inventor's certificates and other forms of protection (hereinafter referred to as the Patents) thereon granted in any and all countries and groups of countries.

NOW, THEREFORE, in consideration of good and valuable consideration acknowledged by said Assignors to have been received in full from said Assignee:

1. Said Assignors hereby sell, assign, transfer and convey to Assignee the full and exclusive right, title and interest (a) in and to said Application and said Invention; (b) in and to all rights to apply for patents on said Invention in any and all countries pursuant to the International Convention for the Protection of Industrial Property or otherwise; (c) in and to any and all Applications filed and any and all Patents granted on said Invention in any and all countries and groups of countries, including each and every Application filed and each and every Patent granted on any application which is a division, substitution, or continuation of said Application; and (d) in and to each and every reissue or extension of any of said Patents.

2. Said Assignors hereby covenant and agree to cooperate with said Assignee to enable said Assignee to enjoy to the fullest extent the right, title and interest to said Invention herein conveyed in any and all countries and groups of countries. Such cooperation by said Assignors shall include prompt production of pertinent facts and documents, giving testimony, execution of petitions, oaths, specifications, declarations or other papers, and other assistance all to the extent deemed necessary or desirable by said Assignee (a) for perfecting in said Assignee the right, title and interest herein conveyed; (b) for prosecuting any of said applications; (c) for filing and prosecuting substitute, divisional, continuing or additional applications covering said Invention; (d) for filing and prosecuting applications for reissuance of any of said Patents; (e) for interference or other priority proceedings involving said Invention; and (f) for legal proceedings involving said Invention and any application therefore and any Patents granted thereon, including without limitation opposition proceedings, cancellation proceedings, priority contests, public use proceedings, infringement actions and court actions; provided, however, that the expense incurred by said Assignors in providing such cooperation shall be paid for by said Assignee.

3. The term and covenants of this agreement shall inure to the benefit of said Assignee, its
successors, assigns and other legal representatives, and shall be binding upon said Assignors, their respective heirs, legal representatives and assigns.

4. Said Assignors hereby warrant and represent that they have not entered and will not enter into any assignment, contract, or understanding in conflict herewith.

5. Said Assignors hereby authorize and request the attorneys of record to insert, where indicated above, the application number and filing date of said application when known.

IN WITNESS WHEREOF, the said Assignors have executed and delivered this instrument to said Assignee on the dates indicated below.

1) [Signature]
   Ashok Sinha
   2001

2) [Signature]
   Ming Xi
   2001
ASSIGNMENT FOR APPLICATION FOR PATENT

WHEREAS:

Names and Addresses of Inventors:

1) Ashok Sinha
   4176 Hubbart Drive
   Palo Alto, California 94306

2) Ming Xi
   138 Beaumere Way
   Milpitas, California 95035

(hereinafter referred to as Assignors), have invented a certain invention entitled

BIFURCATED DEPOSITION PROCESS FOR DEPOSITING REFRACATORY METAL LAYERS
EMPLOYING ATOMIC LAYER DEPOSITION AND CHEMICAL VAPOR DEPOSITION TECHNIQUES

for which application for Letters Patent in the United States is filed herewith,

having serial number ____ 09/1405,593 ___, filed on ____ June 28, 2000 ____ herewith

WHEREAS, Applied Materials, Inc., a corporation of the State of Delaware, having a place of
business at 3050 Bowers Avenue, Santa Clara, California 95054 (hereinafter referred to as Assignee), is
desirous of acquiring the entire right, title and interest in and to said application (hereinafter referred to as
the Application), and the invention disclosed therein (hereinafter referred to as the Invention), and in and
to all embodiments of the Invention, heretofore conceived, made or discovered by said Assignors, and in
and to any and all patents, inventor's certificates and other forms of protection (hereinafter referred to as
the Patents) thereon granted in any and all countries and groups of countries.

NOW, THEREFORE, in consideration of good and valuable consideration acknowledged by said
Assignors to have been received in full from said Assignee:

1. Said Assignors hereby sell, assign, transfer and convey to Assignee the full and exclusive
   right, title and interest (a) in and to said Application and said Invention; (b) in and to all rights to apply for
   patents on said Invention in any and all countries pursuant to the International Convention for the
   Protection of Industrial Property or otherwise; (c) in and to any and all Applications filed and any and all
   Patents granted on said Invention in any and all countries and groups of countries, including each and
   every Application filed and each and every Patent granted on any application which is a division,
   substitution, or continuation of said Application; and (d) in and to each and every reissue or extension of
   any of said Patents.

2. Said Assignors hereby covenant and agree to cooperate with said Assignee to enable
   said Assignee to enjoy to the fullest extent the right, title and interest to said Invention herein conveyed in
   any and all countries and groups of countries. Such cooperation by said Assignors shall include prompt
   production of pertinent facts and documents, giving testimony, execution of petitions, oaths, specifications,
   declarations or other papers, and other assistance all to the extent deemed necessary or desirable by said
   Assignee (a) for perfecting in said Assignee the right, title and interest herein conveyed; (b) for
   prosecuting any of said applications; (c) for filing and prosecuting substitute, divisional, continuing or
   additional applications covering said Invention; (d) for filing and prosecuting applications for reissuance of
   any of said Patents; (e) for interference or other priority proceedings involving said Invention, and (f) for
   legal proceedings involving said Invention and any application therefore and any Patents granted thereon,
   including without limitation opposition proceedings, cancellation proceedings, priority contests, public use
   proceedings, infringement actions and court actions; provided, however, that the expense incurred by said
   Assignors in providing such cooperation shall be paid for by said Assignee.

3. The term and covenants of this agreement shall inure to the benefit of said Assignee, its
successors, assigns and other legal representatives, and shall be binding upon said Assignors, their respective heirs, legal representatives and assigns.

4. Said Assignors hereby warrant and represent that they have not entered and will not enter into any assignment, contract, or understanding in conflict herewith.

5. Said Assignors hereby authorize and request the attorneys of record to insert, where indicated above, the application number and filing date of said application when known.

IN WITNESS WHEREOF, the said Assignors have executed and delivered this instrument to said Assignee on the dates indicated below:

1) ____________________ 2000
   Ashok Sinha

2) ____________________ 2000
   Ming Xi