

## PATENT ASSIGNMENT

Electronic Version v1.1  
 Stylesheet Version v1.1

| SUBMISSION TYPE:   | NEW ASSIGNMENT              |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
|--|-----------------------------|---------------|-----------------------------|---------------------|--------------|------------------------|------------|-----------------|------------|-----------------|------------|--------------|-------|
| NATURE OF CONVEYANCE:  | ASSIGNMENT                  |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| CONVEYING PARTY DATA   |                             |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| <table border="1"> <thead> <tr> <th>Name</th> <th>Execution Date</th> </tr> </thead> <tbody> <tr> <td>Bernard P. McGrail</td> <td>08/19/2013</td> </tr> <tr> <td>Praveen K. Thallapally</td> <td>08/19/2013</td> </tr> <tr> <td>Radha K. Motkur</td> <td>08/19/2013</td> </tr> <tr> <td>Jeromy WJ Jenks</td> <td>08/20/2013</td> </tr> </tbody> </table>                         |                             | Name          | Execution Date              | Bernard P. McGrail  | 08/19/2013   | Praveen K. Thallapally | 08/19/2013 | Radha K. Motkur | 08/19/2013 | Jeromy WJ Jenks | 08/20/2013 |              |       |
| Name   | Execution Date              |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Bernard P. McGrail   | 08/19/2013                  |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Praveen K. Thallapally   | 08/19/2013                  |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Radha K. Motkur  | 08/19/2013                  |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Jeromy WJ Jenks  | 08/20/2013                  |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| RECEIVING PARTY DATA   |                             |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| <table border="1"> <tr> <td>Name:</td> <td>Battelle Memorial Institute</td> </tr> <tr> <td>Street Address:</td> <td>P.O. Box 999</td> </tr> <tr> <td>Internal Address:</td> <td>M/S K1-53</td> </tr> <tr> <td>City:</td> <td>Richland</td> </tr> <tr> <td>State/Country:</td> <td>WASHINGTON</td> </tr> <tr> <td>Postal Code:</td> <td>99352</td> </tr> </table>                 |                             | Name:         | Battelle Memorial Institute | Street Address:     | P.O. Box 999 | Internal Address:      | M/S K1-53  | City:           | Richland   | State/Country:  | WASHINGTON | Postal Code: | 99352 |
| Name:  | Battelle Memorial Institute |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Street Address:  | P.O. Box 999                |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Internal Address:  | M/S K1-53                   |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| City:  | Richland                    |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| State/Country:   | WASHINGTON                  |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Postal Code:   | 99352                       |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| PROPERTY NUMBERS Total: 2  |                             |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| <table border="1"> <thead> <tr> <th>Property Type</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Application Number:</td> <td>61683322</td> </tr> <tr> <td>PCT Number:</td> <td>US1354863</td> </tr> </tbody> </table>   |                             | Property Type | Number                      | Application Number: | 61683322     | PCT Number:            | US1354863  |                 |            |                 |            |              |       |
| Property Type  | Number                      |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| Application Number:  | 61683322                    |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| PCT Number:  | US1354863                   |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| CORRESPONDENCE DATA  |                             |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| <p>Fax Number: 5093754487<br/> <i>Correspondence will be sent via US Mail when the fax attempt is unsuccessful.</i></p> <p>Phone: 509-375-6866<br/>       Email: ipdocket@pnnl.gov</p> <p>Correspondent Name: BATTELLE MEMORIAL INSTITUTE<br/>       Address Line 1: P.O. Box 999<br/>       Address Line 2: M/S K1-53<br/>       Address Line 4: Richland, WASHINGTON 99352</p> |                             |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |
| ATTORNEY DOCKET NUMBER:  | 30064-E                     |               |                             |                     |              |                        |            |                 |            |                 |            |              |       |

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|---|-----------------|
| NAME OF SUBMITTER:  | Allan C. Tuan   |
| Signature:  | /Allan C. Tuan/ |
| Date:   | 08/20/2013      |
| <b>Total Attachments: 6</b><br>source=assignmentexecuted30064E#page1.tif<br>source=assignmentexecuted30064E#page2.tif<br>source=assignmentexecuted30064E#page3.tif<br>source=assignmentexecuted30064E#page4.tif<br>source=assignmentexecuted30064E#page5.tif<br>source=assignmentexecuted30064E#page6.tif |                 |

## ASSIGNMENT OF PATENT RIGHTS

Bernard P. McGrail  
Praveen K. Thallapally  
Radha K. Motkuri  
Jeromy WJ Jenks

To  
Battelle Memorial Institute

WHEREAS, we, Bernard P. McGrail of Pasco, County of Franklin, State of Washington, Praveen K. Thallapally of Richland, County of Benton, State of Washington, Radha K. Motkuri of Richland, County of Benton, State of Washington, and Jeromy WJ Jenks of Benton City, County of Benton, State of Washington; hereinafter INVENTORS, have made certain inventions related to, Adsorption Systems Using Metal Organic Frameworks, including those, described and claimed in various disclosures including:

U.S. Provisional Application No. 61/683,322, filed August 15, 2012, Entitled: Adsorption Systems Using Metal Organic Frameworks

PCT Application No. PCT/US13/54863, filed August 14, 2013 Entitled: Adsorption Systems Using Metal-Organic Frameworks

For which we are about to make application for Letters Patent of the United States; collectively referred to hereinafter as INVENTIONS;

WHEREAS Battelle Memorial Institute, a corporation of Ohio, organized and existing under the laws of the State of Ohio, and having a place of business in the City of Richland, Washington, is desirous of acquiring all right, title, and interest in the said INVENTIONS and in all patents or patent applications sought or obtained therefor;

NOW, THEREFORE, be it known to all those who may be concerned, that for and in consideration of the sum of One Dollar (\$1.00) each, and other good and valuable considerations, the receipt of which is hereby acknowledged, We the INVENTORS have each sold, assigned, and transferred, and by these presents do sell, assign and transfer unto the said Battelle Memorial Institute, the entire right, title, and interest in and to the INVENTIONS shown, described, or claimed herein, and the full and exclusive right, title, and interest to any and all patents and patent applications that show, describe or claim said INVENTIONS including but not limited to those applications referenced herein, and in and to any extensions, continuations, including continuations in part, reissues, divisions, or renewals thereof; and We each do hereby authorize and request the Commissioner of Patents or other proper Officer, to issue such Letters Patent, or any of them to the said Battelle Memorial Institute, as the assignee of my entire right, title, and interest in and to the same for the sole use and benefit of the said Battelle Memorial Institute, and its successors or assigns.

We each further covenant and agree that we each will, at the request and expense of the said Battelle Memorial Institute, execute such other and further assurances of title as may be necessary or proper to fully convey the interest herein sought to be conveyed; and that each of us will, at the request and expense of the said Battelle Memorial Institute, execute such application papers as may be desired by the said Battelle Memorial Institute, for the filing of any division or renewal of the application herein conveyed, or for reissues or extensions (including continuations or continuations in part applications), or any Letters Patent that may be granted upon said application, and will execute such Supplemental Oaths and Preliminary Statements, or other papers as desired by the said Battelle Memorial Institute.

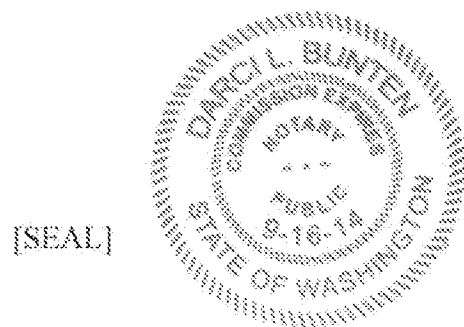
We each further assign unto the said Battelle Memorial Institute, the whole right, title, and interest to the invention disclosed in the application throughout all countries foreign to the United States, and do hereby authorize the said Battelle Memorial Institute to apply for patents therefor in its own name in countries where such procedure is proper and to claim the benefit of International Conventions and agree to execute applications of the said invention in the several countries where it is necessary that the same be executed by the inventors, and to execute assignments of such applications and the patents to be obtained therefor to the said Battelle Memorial Institute, the assignee herein, as well as all other necessary papers.

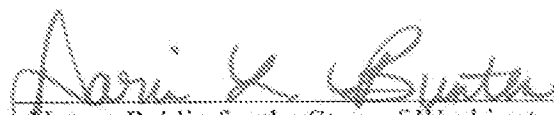
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Executed at Richland, State of Washington, this 19 day of August, 2013.

  
\_\_\_\_\_  
Bernard P. McGrail

STATE OF WASHINGTON       )  
                                      )     ss.  
County of Benton            )

This 19 day of August, 2013, before me personally came the above-named Bernard P. McGrail who executed the foregoing instrument in my presence, and who acknowledged to me that he executed the same of his own free will for the purposes set forth therein.



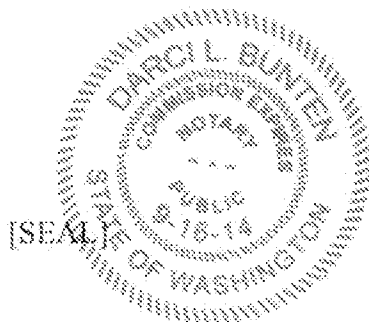
  
\_\_\_\_\_  
Notary Public for the State of Washington.  
My commission expires: 9/16/14.

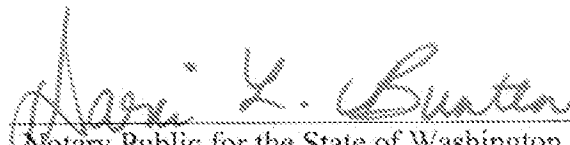
Executed at Richland, State of Washington, this 19 day of August, 2013.

  
Praveen K. Thallapally

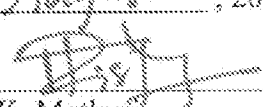
STATE OF WASHINGTON     )  
                                      ) ss.  
County of Benton         )

This 19 day of August, 2013, before me personally came the above-named Praveen K. Thallapally who executed the foregoing instrument in my presence, and who acknowledged to me that he executed the same of his own free will for the purposes set forth therein.



  
Notary Public for the State of Washington.  
My commission expires: 9/16/14

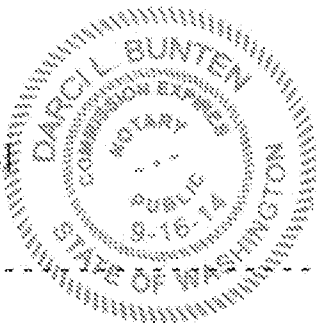
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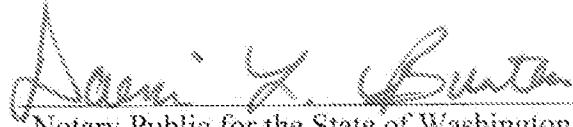
  
\_\_\_\_\_  
Radha K. Motkuri

STATE OF WASHINGTON       )  
                                      )   ss.  
County of Benton            )

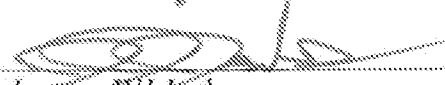
This 19 day of August, 2013, before me personally came the above-named Radha K. Motkuri who executed the foregoing instrument in my presence, and who acknowledged to me that he executed the same of his own free will for the purposes set forth therein.

[SEAL]



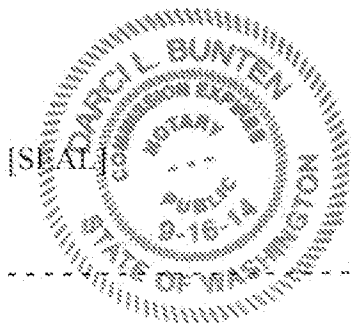
  
\_\_\_\_\_  
Notary Public for the State of Washington.  
My commission expires: 9/16/14.


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Executed at Richland, State of Washington, this 20 day of August, 2013.

  
\_\_\_\_\_  
Jeremy WJ Jenks

STATE OF WASHINGTON     )  
                                      )     ss.  
County of Benton         )

This 20 day of August, 2013, before me personally came the above-named Jeremy WJ Jenks who executed the foregoing instrument in my presence, and who acknowledged to me that he executed the same of his own free will for the purposes set forth therein.



  
\_\_\_\_\_  
Notary Public for the State of Washington.  
My commission expires: 9/16/14