

## PATENT ASSIGNMENT COVER SHEET

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<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
FANXING LI	08/02/2019
LUKE MICHAEL NEAL	05/30/2019
JUNSHE ZHANG	05/31/2019
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	NORTH CAROLINA STATE UNIVERSITY
<b>Street Address:</b>	OFFICE OF RESEARCH COMMERCIALIZATION
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<b>City:</b>	RALEIGH
<b>State/Country:</b>	NORTH CAROLINA
<b>Postal Code:</b>	27606
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	16332509
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	(770)951-0933
<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>	7709339500
<b>Email:</b>	ragan.buckley@thomashorstemeyer.com
<b>Correspondent Name:</b>	LAWRENCE A. VILLANUEVA
<b>Address Line 1:</b>	3200 WINDY HILL ROAD SE
<b>Address Line 2:</b>	SUITE 1600 E
<b>Address Line 4:</b>	ATLANTA, GEORGIA 30339
<b>ATTORNEY DOCKET NUMBER:</b>	221404-1290
<b>NAME OF SUBMITTER:</b>	LAWRENCE A. VILLANUEVA
<b>SIGNATURE:</b>	/Lawrence A. Villanueva/
<b>DATE SIGNED:</b>	09/03/2019
<b>Total Attachments: 5</b>	
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**ASSIGNMENT  
OF UTILITY PATENT APPLICATION**

WHEREAS, the following parties:

<u>Name</u>	<u>Address</u>
Fanxing Li	205 Ivyshaw Road Cary, NC 27519
Luke Michael Neal	700 Maroubra Loop, Apt. 7202 Cary, NC 27513
Junshe Zhang	28 Xianning West Rd., Beilin District Xi'an, Shaanxi 710049 P.R. China

hereinafter referred to as ASSIGNOR, has/have invented certain new and useful improvements ("invention(s)") as described and set forth in the below-identified utility application for United States Letters Patent entitled:

**REDOX CATALYSTS FOR THE OXIDATIVE CRACKING OF HYDROCARBONS,  
METHODS OF MAKING, AND METHODS OF USE THEREOF,**

which was:

- executed on even date herewith,
- filed with the United States Patent and Trademark Office (USPTO) on March 12, 2019, and assigned Serial No. 16/332,509, and
- further described in U.S. Provisional application filed with the USPTO on September 12, 2016, and assigned Serial No. 62/393,411, and International application filed on September 12, 2017, and assigned Serial No. PCT/US2017/051157.

WHEREAS, **North Carolina State University**, having a place of business at Office of Research Commercialization, 1021 Main Campus Drive, 2<sup>nd</sup> Floor, Raleigh, NC 27606, hereinafter referred to as ASSIGNEE, is desirous of acquiring ASSIGNOR'S interest in and to said invention(s), said utility application, said provisional application, and any U.S. and foreign patents which are related to the same.

NOW, THEREFORE, TO ALL WHOM IT MAY CONCERN: Be it known that, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by ASSIGNOR, ASSIGNOR has sold, assigned and transferred and does hereby sell, assign and transfer unto ASSIGNEE, and ASSIGNEE'S successors and assigns, (a) the entire right, title and interest, for the United States of America, in and to said invention(s), said utility application, and said Provisional application and all the rights and privileges in any application and under any and all patents that may be granted in the U.S. for said inventions, including all corresponding provisional, continuation, continuation-in-part, divisional, reissue, and reexamination applications; and (b) the entire right, title and interest in and to said invention(s), said utility application, and said provisional application for all countries foreign to the U.S., including all rights of priority arising from them, and all the

rights and privileges under any and all forms of protection, including patents, that may be granted in said countries foreign to the U.S. for them.

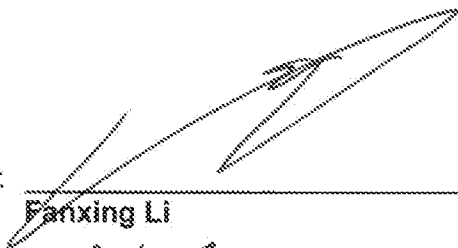
ASSIGNOR authorizes ASSIGNEE to make application for such protection in its own name and maintain such protection in any and all countries foreign to the U.S., and to invoke and claim for any application for patent or other form of protection for said inventions, without further authorization from ASSIGNOR, any and all benefits, including the right of priority provided by any and all treaties, conventions, or agreements.

ASSIGNOR hereby consents that a copy of this assignment shall be deemed a full legal and formal equivalent of any document which may be required in any country in proof of the right of ASSIGNEE to apply for patent or other form of protection for said inventions, said utility application, or said provisional application and to claim the aforesaid benefit of the right of priority.

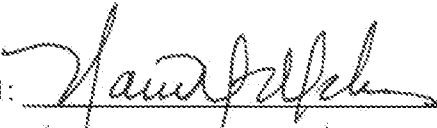
ASSIGNOR requests that any and all patents for said inventions be issued to ASSIGNEE in the U.S. and to ASSIGNEE in all countries foreign to the U.S., or to such nominee as ASSIGNEE may designate.

ASSIGNOR covenants and agrees that, when requested, ASSIGNOR shall, without charge to ASSIGNEE but at ASSIGNEE'S expense, sign all papers, take all rightful oaths, and do all acts which may be necessary, desirable, or convenient in connection with the patent applications, patents, or other forms of protection of said invention(s), and for the defense and protection thereof if challenged in the court of law.


ASSIGNOR authorizes ASSIGNEE or its agents to insert, on ASSIGNOR's behalf, the filing date and/or serial number above pertaining to the utility application and/or the provisional application, if not known as of the date of execution of this document.

INVENTOR:   
Fanxing Li  
City/Country Raleigh USA

Date: 08/02/19

WITNESS 1:   
Print Name: Nancy McInnes  
City/Country Raleigh, NC, USA

Date: 8/2/19

WITNESS 2:   
Print Name: Brian Eller  
City/Country Cary USA

Date: 8/2/2019

Luke M Neal  
Luke Michael Neal

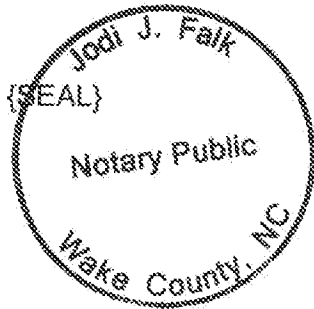
Date: 5/30/2019

United States of America

State of North Carolina


County of Wake

On this 30<sup>th</sup> day of May, 2019, before me personally came **Luke Michael Neal** to me known to be the individual described above and who executed the foregoing instrument, or acknowledged execution of the same.



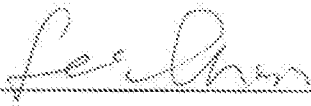
Jodi Falk  
Notary Public

July 29 2019  
My Commission Expires (Date)

INVENTOR:   
Junshu Zhang

Date: May 31, 2019

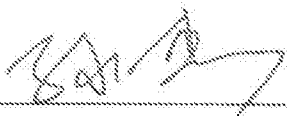
City/Country Xi'an / China

WITNESS 1: 

Date: May 31, 2019

Print Name: Fei Chen

City/Country Xi'an / China

WITNESS 2: 

Date: May 31, 2019

Print Name: Jie Sun

City/Country Xi'an / China