# 507375178 07/08/2022

# PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT7422102

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

# **CONVEYING PARTY DATA**

Name	Execution Date
BERND PENNEMANN	04/04/2022
SHUANG LIANG	02/25/2022
ZHANGYONG MING	04/25/2022
JUERGEN BAUSA	04/04/2022

# **RECEIVING PARTY DATA**

Name:	COVESTRO DEUTSCHLAND AG			
Street Address:	KAISER-WILHELM-ALLEE 60			
City:	LEVERKUSEN			
State/Country:	GERMANY			
Postal Code:	51373			
Name:	COVESTRO LLC			
Street Address:	1 COVESTRO CIRCLE			
City:	PITTSBURGH			
State/Country:	PENNSYLVANIA			
Postal Code:	15205			

# **PROPERTY NUMBERS Total: 1**

Property Type	Number
Application Number:	17678360

# **CORRESPONDENCE DATA**

Fax Number:

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.

**Phone:** 412-413-3820

Email: US-IPR@covestro.com

Correspondent Name: COVESTRO LLC

Address Line 1: 1 COVESTRO CIRCLE

Address Line 4: PITTSBURGH, PENNSYLVANIA 15205

ATTORNEY DOCKET NUMBER: 2020P30203US

NAME OF SUBMITTER: DONALD R. PALLADINO

PATENT REEL: 060460 FRAME: 0518

507375178

SIGNATURE:	/Donald R. Palladino/			
DATE SIGNED:	07/08/2022			
Total Attachments: 7				
source=2022-07-08AssignmentCDAG2020P30203US#page1.tif				
source=2022-07-08AssignmentCDAG2020P30203US#page2.tif				
source=2022-07-08AssignmentCDAG2020P30203US#page3.tif				
source=2022-07-08AssignmentCDAG2020P30203US#page4.tif				
source=2022-07-08AssignmentCDAG2020P30203US#page5.tif				
source=2022-07-08AssignmentCDAG2020P30203US#page6.tif				

source = 2022-07-08 Assignment LLC 2020P30203US#page1.tif

# ASSIGNMENT WITH DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

#### ASSIGNMENT

Whereas, I/We, the undersigned inventor(s) hereinafter called assignor(s), have invented certain improvements described in the application identified below, and

Whereas, Covestro LLC of 1 Covestro Circle, 15205, Pittsburgh, (assignee) and Covestro Deutschland AG of Kaiser-Wilhelm-Allee 60, 51373, Leverkusen, (assignee), desires to acquire the entire right, title, and interest in the application and invention, and to any United States patents to be obtained therefor;

Now therefore, for valuable consideration, receipt whereof is hereby acknowledged,

I/We, the above named assignor(s), hereby sell, assign and transfer to the above named assignee, its successors, legal representatives, and assigns, my/our entire right, title and interest, if any, in the invention and the application for the United States of America, including all direct and indirect divisions, continuations, and continuations-in-part thereof, and all original, extended, reissued, reviewed, and reexamined Letters Patent of the United States, and all countries foreign thereto, that may be granted thereon, including rights of priority under the International Convention of Paris (1883) as amended, including the right to claim priority under 35 U S C §119, and I/we request the Director of the U S Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns, and I/we hereby agree that the assignee may apply for foreign Letters Patent on the invention and I/we will without further consideration, communicate all facts know to me/us and execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee, its successors, legal representatives, or assigns. I/We further represent and warrant that I/We have the full right to convey the interest assigned by this assignment, and that I/We have not granted any rights inconsistent with the rights granted herein I/We further acknowledge an obligation of assignment of this invention to assignee at the time the invention was

### DECLAR

nade	
Legaliza	ation not required for recording but is prima facie evidence of execution under 35 U S C §261)
ATION	
s a belo	ow named inventor, I hereby declare that this assignment with declaration is directed to
	The attached application, OR  United States Application 17/678,360 or PCT International Application Number filed on February 23, 2022 (Confirmation No 7672)
PR	E-AIA
	My residence, mailing address, and citizenship are as stated below next to my name
	I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled METHOD FOR OPERATING A RECTIFICATION COLUMN
	I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above
	I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1 56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application
	I hereby declare that all statements made herem of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United

### POST-AIA

The above identified application was made or was authorized to be made by me

I believe I am the original inventor or an original joint inventor of a claimed invention in the application

I hereby acknowledge that any willful false statement made in this assignment with declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

## Authorization To Permit Access To Application by Participating Office

☐ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application See 37 CFR 1 14(c) and (h) This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the application

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the application-as-filed with respect to: 1) the above-identified patent application-as-filed, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application, and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Office.

FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP: SIGNATURE/DATE:	1. Dr. Bernd PENNEMANN 51467 Bergisch Gladbach; DE Lisztstr. 1; 51467 Bergisch Gladbach; DE DE  String of the temperature 4, 4, 7022
FULL NAME OF INVENTOR: RESIDENCE; POST OFFICE ADDRESS: CITIZENSHIP: SIGNATURE/DATE;	2. Shuang LIANG 77059 Houston;US 11831 Mighty Redwood Dr; 77059 Houston;US US
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP: SIGNATURE/DATE:	3. Zhangyong MING 201507 Shanghar;CN Room 412 Bld. C404, No.82 Muhua Road, Shanghai Chemical Industry Park, Caojing; 201507 Shanghai;CN CN
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP: SIGNATURE/DATE:	4. Dr. Juergeri BAUSA 51515 Kürten;DE Rotkäppehenweg 9; 51515 Kürten;DE DE

Internal Reference: 2020P30203 US

### ASSIGNMENT WITH DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

#### ASSIGNMENT

Whereas, I/We, the undersigned inventor(s) hereinafter called assignor(s), have invented certain improvements described in the application identified below, and

Whereas, Covestro LLC of 1 Covestro Cricle, 15205, Pittsburgh, (assignee) and Covestro Deutschland AG of Kaiser-Wilhelm-Allee 60, 51373, Leverkusen, (assignee), desires to acquire the entire right, title, and interest in the application and invention, and to any United States patents to be obtained therefor,

Now therefore, for valuable consideration, receipt whereof is hereby acknowledged,

I/We, the above named assignor(s), hereby sell, assign and transfer to the above named assignee, its successors, legal representatives, and assigns, my/our entire right, title and interest, if any, in the invention and the application for the United States of America, including all direct and indirect divisions, continuations, and continuations-in-part thereof, and all original, extended, reissued, reviewed, and reexamined Letters Patent of the United States, and all countries foreign thereto, that may be granted thereon, including rights of priority under the International Convention of Paris (1883) as amended, including the right to claim priority under 35 U S C §119, and I/we request the Director of the U S. Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns, and I/we hereby agree that the assignee may apply for foreign Letters Patent on the invention and I/we will without further consideration, communicate all facts know to me/us and execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee, its successors, legal representatives, or assigns. I/We further represent and warrant that I/We have the full right to convey the interest assigned by this assignment, and that I/We have not granted any rights inconsistent with the rights granted herein. I/We further acknowledge an obligation of assignment of this invention to assignee at the time the invention was made.

(Legalization not required for recording but is prima facie evidence of execution under 35 U S C. §261)

#### DECLARATION

As a bel	ow named inventor, I hereby	declai	e that	this assignment with declaration is directed to
	The attached application,	OR	$\boxtimes$	United States Application 17/678,360 or PCT International Application
				Number filed on February 23, 2022 (Confirmation No. 7672)

#### PRE-AIA

My residence, mailing address, and citizenship are as stated below next to my name.

I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled METHOD FOR OPERATING A RECTIFICATION COLUMN

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

# POST-AIA

Internal Reference 2020P30203 US

The above identified application was made or was authorized to be made by me

I believe I am the original inventor or an original joint inventor of a claimed invention in the application

I hereby acknowledge that any willful false statement made in this assignment with declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

## Authorization To Permit Access To Application by Participating Office

☐ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application. See 37 CFR 1 14(c) and (h) This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the application.

In accordance with 37 CFR 1 14(h)(3), access will be provided to a copy of the application-as-filed with respect to 1) the above-identified patent application-as-filed, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1 55 has been filed in the above-identified patent application, and 3) any U S application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1 14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Office

FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS CITIZENSHIP:	1 Dr. Beind PENNEMANN 51467 Bergisch Gladbach,DE Lisztstr 1; 51467 Beigisch Gladbach,DE DE
SIGNATURE/DATE:	
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP:	2 Shuang LIANG 77059 Houston,US 11831 Mighty Redwood D1; 77059 Houston;US US
SIGNATURE/DATE:	
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP: SIGNATURE/DATE.	3 Zhangyong MING 201507 Shanghai, CN Room 412 Bld. C404, No.82 Muhua Road, Shanghai Chemical Industry Park, Caojing; 201507 Shanghai, CN CN Zhangyong Ming April 25, 2022
FULL NAME OF INVENTOR. RESIDENCE POST OFFICE ADDRESS: CITIZENSHIP:	4. Dr. Juergen BAUSA 51515 Kürten;DE Rotkäppchenweg 9, 51515 Kürten;DE DE
SIGNATURE/DATE:	

#### ASSIGNMENT WITH DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

#### ASSIGNMENT

Whereas, I/We, the undersigned inventor(s) hereinafter called assignor(s), have invented certain improvements described in the application identified below, and

Whereas, Covestro LLC of I Covestro Circle, 15205, Pittsburgh, (assignee) and Covestro Deutschland AG of Kaiser-Wilhelm-Allee 60, 51373, Leverkusen, (assignee), desires to acquire the entire right, title, and interest in the application and invention, and to any United States patents to be obtained therefor,

Now therefore, for valuable consideration, receipt whereof is hereby acknowledged,

I/We, the above named assignor(s), hereby sell, assign and transfer to the above named assignee, its successors, legal representatives, and assigns, iny/our entire right, title and interest, if any, in the invention and the application for the United States of America, including all direct and indirect divisions, continuations, and continuations-in-part thereof, and all original, extended, reissued, reviewed, and reexamined Letters Patent of the United States, and all countries foreign thereto, that may be granted thereon, including rights of priority under the International Convention of Paris (1883) as amended, including the right to claim priority under 35 U S C §119, and I/we request the Director of the U S Patent and Trademark Office to issue any Letters Patent granted upon the invention set forth in the application to the assignee, its successors and assigns; and I/we hereby agree that the assignee may apply for foreign Letters Patent on the invention and I/we will without further consideration, communicate all facts know to me/us and execute without further consideration all papers deemed necessary by the assignee in connection with the United States and foreign applications when called upon to do so by the assignee, its successors, legal representatives, or assigns. I/We further represent and warrant that I/We have the full right to convey the interest assigned by this assignment, and that I/We have not granted any rights inconsistent with the rights granted herein. I/We further acknowledge an obligation of assignment of this invention to assignee at the time the invention was made.

### DECLARATION

full 11gl	to so by the assignee, its successors, legal representatives, or assigns—If we further represent and warrant that if we have the hit to convey the interest assigned by this assignment, and that I/We have not granted any rights inconsistent with the rights. Herein—I/We further acknowledge an obligation of assignment of this invention to assignee at the time the invention was
(Legalii	zation not required for recording but is prima facie evidence of execution under 35 U S.C §261)
RATIO	N .
As a be	low named inventor, I hereby declare that this assignment with declaration is directed to
	The attached application, OR  United States Application 17/678,360 or PCT International Application Number filed on February 23, 2022 (Confirmation No. 7672)
P	RE-AIA
	My residence, mailing address, and citizenship are as stated below next to my name
	I believe the inventor(s) named below to be the original and first inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention titled METHOD FOR OPERATING A RECTIFICATION COLUMN
	I hereby state that I have reviewed and understand the contents of the above identified application, including the claims, as amended by any amendment specifically referred to above
	I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1 56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application
	I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon

# POST-AIA

The above identified application was made or was authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the application

I hereby acknowledge that any willful false statement made in this assignment with declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both

# Authorization To Permit Access To Application by Participating Office

☐ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office
(JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property
offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent
application Sec 37 CFR 1 14(c) and (h) This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, or other
intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the
application

In accordance with 37 CFR 1 14(h)(3), access will be provided to a copy of the application-as-filed with respect to 1) the above-identified patent application-as-filed, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1 55 has been filed in the above-identified patent application, and 3) any U S application-as-filed from which benefit is sought in the above-identified patent application

In accordance with 37 CFR 1 14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Office

FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP: SIGNATURE/DATE	1. Dr. Bernd PENNEMANN 51467 Bergisch Gladbach;DE Lisztstr.1; 51467 Bergisch Gladbach;DE DE
SIGNATURE/DATE	
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS CITIZENSHIP:	<ul><li>2. Shuang LIANG</li><li>77059 Houston;US</li><li>11831 Mighty Redwood Dr; 77059 Houston;US</li><li>US</li></ul>
SIGNATURE/DATE:	
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP:	<ol> <li>Zhangyong MING</li> <li>201507 Shanghai;CN</li> <li>Room 412 Bld. C404, No.82 Muhua Road, Shanghai Chemical Industry Park, Caojing; 201507 Shanghai;CN</li> </ol>
SIGNATURE/DATE	
FULL NAME OF INVENTOR: RESIDENCE: POST OFFICE ADDRESS: CITIZENSHIP:	4. Dr. Juergen BAUSA 51515 Kürten;DE Rotkäppchenweg 9; 51515 Kürten;DE DE
SIGNATURE/DATE·	2022-04-04

Internal Reference 2020P30203 US

# **ASSIGNMENT**

WHEREAS I,

Shuang LIANG 11831 Mighty Redwood Dr Houston, TX 77059 US

### of Covestro LLC

RECORDED: 07/08/2022

have invented certain improvements in <u>METHOD FOR OPERATING A RECTIFICATION COLUMN</u> described in a patent application executed by us and identified in the United States Patent Office as follows:

Serial No.: <u>17/678,360</u> Filed: <u>02/23/2022</u>

and Attorney's Docket No.: 2020P30203US; and

WHEREAS, COVESTRO LLC, of Pittsburgh, Pennsylvania, a limited liability company of the State of Delaware is desirous of acquiring the entire right, title and interest in and to said invention or inventions and any and all patents to be obtained therefore; this document may be executed in any number of counterparts, each of which so executed shall be deemed to be an original, but all such counterparts shall together constitute but one and the same document.

NOW, THEREFORE, for valuable consideration and in accordance with the obligations in my employment contracts with COVESTRO LLC, I do hereby sell, assign and transfer unto said COVESTRO LLC, its successors and assigns, the entire right, title, and interest in and to said invention or inventions, as described in the aforesaid application, in any form or embodiment thereof, and in and to the aforesaid application; and in and to any applications filed in any foreign country based thereon, including the right to file said foreign applications under the provisions of the International Convention; also any improvements on said invention or inventions now or hereafter made by us during the period of my employment; also the entire right, title and interest in and to any and all patents or reissues or extensions thereof to be obtained in this or any foreign country upon said invention, inventions or improvements and any divisional, continuation, continuation-in-part or substitute applications which may be filed upon said invention, inventions or improvements in this or any foreign country; and I hereby authorize and request the issuing authority to issue any and all patents on said application or applications to said COVESTRO LLC, as assignee of the entire interest.

I further agree, without any payment by COVESTRO LLC, other than expenses incurred by the undersigned, to communicate to said COVESTRO LLC, its representatives or agents, any facts relating to said invention, inventions or improvements, including evidence for interference purposes or for other legal proceedings, whenever requested, testify in any interference or other legal proceedings, whenever requested; and execute and deliver, on request, all lawful papers required to make any of the foregoing provisions effective.

25-Feb-2022	Shuang Liang (L.S.) / Shuang Liang (Feb 25, 2022 14:08 CST)
(Date)	Shuang LIANG