orm PTO-1595 (Rev. 03-11) MB No. 0651-0027 (exp. 03/31/2015)	U.S. DEPARTMENT OF COMMERCE United States Patent and Tredemark Office
RECORDATION FOR	
PATENTS	
To the Director of the U.S. Palent and Trademark Office: Please	
1. Name of conveying party(les):	2. Name and address of receiving party(ies)
Dong-Hyun Ko (01/27/2011), Sung-Shik Eom	Name: LG Chem, Ltd.
(01/26/2011), Yong-Jin Choe (01/26/2011), Chan- Hong Lee (02/01/2011),	Internal Address:
Additional name(s) of conveying party(ies) attached? X Yes No	Street Address:
3, Nature of conveyance/Execution Date(s):	
•	LG Twin Towers 20, Yeouido-dong
Execution Date(s): in parentheses after inventor name	Yeongdeungpo-gu
X Assignment Merger Change of Name	
Security Agreement Joint Research Agreement	City: Seoul
Government Interest Assignment	State:
Executive Order 9424, Confirmatory License	Country: Republic of Korea Zip: 150-721
Other	Additional name(s) & address(es) Yes X No attached?
4. Application or patent number(s):	This document is being filed together with a new application.
Additional numbers attached	17 Yes X No
Name and address to whom correspondence concerning document should be mailed:	6. Total number of applications and patents involved:
Name: Kelly Y. Hwang LERNER. DAVID, LITTENBERG, KRUMHOLZ & MENTLIK, LLP	7. Total fee (37 CFR 1.21(h) & 3.41) \$ 40.00
Internal Address: Atty. Dkt.:	
Street Address: 600 South Avenue West	X Authorized to be charged to deposit account
	Enclosed
	None required (government interest not affecting title
City: Westfield	8. Payment Information
State: NJ Zip: 07090	-
Phone Number: 908-654-5000 Fax Number: 908-654-7866	Deposit Account Number 12-1095
Fax Number: 908-654-7866 Email Address: mcormier@ldlkm.com	Authorized User Name Kelly Y. Hwang
9. Signature:	
JAST -	N
Signature Signature	
Kelly Y. Hwang - 51,831 Name of Person Signing	Total number of pages including cover sheet, attachments, and documents:

3344402

PATENT REEL: 031663 FRAME: 0218

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RECORDATION FORM COVER SHEET (P10-1595) (supplemental sheet)			
Additional Conve	Additional Conveying Party(ies)/Execution Date(s) (1. Continued):		
Moo-Ho Hang (01/26 (01/26/2011)	Moo-Ho Hong (01/26/2011), O-Hak Kwon (02/01/2011), Dae-Chul Kim (01/27/2011), and Jae-Hui Choi		
Additional Assign	nees (2. Continued):		
Assignee Name:			
Internal Address:			
Street Address:			
City:	Stale:	Country:	Zip;
Assignee Name:		···	
internal Address:			
Ştrael Address:			
City:	State:	Country:	Zip:
Assignee Name:			-
Internal Address:			
Street Address:			
City:	State:	Country:	Zip:
Additional Applic	ations and/or Paten	ts (4. Continued):	
Additional Patent Applica 4A. Continued:	lion Numbers	Additional Patent Numbers 48. Continued:	
	Additional number	rs attached? Yes No	
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LDLKM

Docket No.: LGCHEM 3.9-160 CON CON

REEL: 031663 FRAME: 0219

	termer PTO/SB/15 (8-00) Modified LDLKEM	
ASSIGNMENT OF UTILITY APPLICATION	Docket Number (Optional)	
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON	
VW /*	<u>-</u>	
Whereas, I, Dong-Hyun Ko	of	
	m. Danison 306 750 Danublic of Votes	
601-1601, Songnimmaeul Apt., Hagi-dong, Yuseong-	plu had post improvements in	
hereafter referred to as essignor, have with others invented cart	an new and decidentificoversions of https://www.new.and.com/	
APPARATUS FOR PRODUCING ALCHOLS FROM (ent was fled on Currently Herewith	
for which an application for a United States Letters Pate	City add illion Oil Controlled Controlled	
Application Number for which an application for a United States Letters Patel	nt was executed by me on	
x for which an International Application was filed on	January 15, 2010 , as	
PCT/KR2010/000283 , designating the United	i States.	
And		
Whereas, LG Chem, Ltd.		
a corporation of <u>Korea</u> , <u>Republic of</u> herein referred to as "assign LG Twin Towers; 20 Yeouldo-dong; Yeongdeungpo-gu; Sa	nee whose mailing socress is foul: REPUBLIC OF KOREA 150-721	
LG Twin Towers; 20 Yeouldo-dong; Yeongdeungpo-gu; Se is desirous of acquiring the entire right, title and interest in the s	ame;	
	dollars (\$ 1.00), the receipt whereof	
Is acknowledged, and other good and valuable consideration, I as assignor hereby sell, assign and set over to said assignee my entire right, little and interest for the United States of America and all other countries in and to said invention and the aforesaid utility patent application and all original, divisional, continuation, substitute or reissue applications and petents applied for or granted therefor in the United States of America and all other countries, for said invention, including without limitation all applications and patents for said invention claiming priority or benefit of the aforesaid utility application pursuant to any law or treaty, and including all claims for damages by reason of pass infringement with the right to sue for and collect the same for its own use and the use of its successors, assigns and legal representatives, and including the right to claim such priority or benefit and the Commissioner of Patents and legal representatives, and including the right to claim such priority or benefit and the Commissioner of Patents and Italians is hereby authorized and requested to Issue all patents on said improvements or resulting therefrom to said assignee herein, as assignse of the entire interest therein; and the undersigned for me and my legal representatives, here and assigns do hereby agree and covenant without further remuneration, to execute and deliver representatives, here and assigns do hereby agree and covenant without further remuneration, to execute and deliver assignments thereof to said assignee or its assigns, to communicate to said assignee or its representatives all facts known to the undersigned respecting said improvements, whenever requested, to testify in any interferences or other legal proceedings in which any of said applications or patents may become involved, to sign all lawful papers, make all rightful oaths, and to do generally everything necessary to all assignee, its successors, assigns and nominees to obtain patent protection for said improvements in all coun		
And I do hereby authorize my attorneys to insert on this deed the when known.	ne filing date and application number of said application	
	Danaha K	
Jan. 27, 2011	- 10 31 m/m 40	
Date	Dong-Hyun Ko	
Mungsann LEE Ayped Name of Witness		

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PATENT CARREL: 031663 FRAME: 0220

*Total of

forms are submitted.

former PTO/S9/15 (8-00) Modified LCI KAM

· · · · · · · · · · · · · · · · · · ·	Docket Number (Optional)	
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON	
Whereas, I. Sung-Shik EOM	of .	
602, The PoM-1, Doryong-dong, Yusung-gu, Daejeon	305-340. Republic of Korea	
hereafter referred to as assignor, have with others invented certain new and useful improvements in APPARATUS FOR PRODUCING ALCHOLS FROM OLEFINS		
for which an application for a United States Letters Patent was filed on Currently Herewith Application Number		
for which an application for a United States Letters Patent was executed by me on x for which an International Application was filed on		
PCT/KR2010/000283 designating the United States. And		
Whereas, LG Chem, Ltd. a corporation of Korea, Republic of herein referred to as "assignee" whose mailing address is LG Twin Towers; 20 Yeouido-dong; Yeongdeungpo-gu, Seoul; REPUBLIC OF KOREA 150-721 le desirous of acquiring the entire right, title and interest in the same;		
NOW, THEREFORE, in consideration of the sum of one dollars (\$ 1.00), the receipt whereof is acknowledged, and other good and valuable consideration, I as assigner hereby sell, assign and set over to said assignee my entire right, title and interest for the United States of America and all other countries in and to said invention and the aforesaid utility patent application and all original, divisional, continuation, substitute or release applications and patents applied for or granted therefor in the United States of America and all other countries, for said invention, including without limitation all applications and patents for said invention claiming priority or benefit of the aforesaid utility application pursuant to any law or treaty, and Including all claims for damages by reason of past infringement with the right to sue for and collect the same for its own use and the use of its successors, assigns and legal representatives, and including the right to claim such priority or benefit and the Commissioner of Patents and Trademarks is hereby authorized and requested to issue all patents on said improvements or resulting therefrom to said assignee herein, as assignee of the entire interest therein; and the undersigned for me and my legal representatives, heirs and assignee of the entire interest therein; and the undersigned for me and my legal original, divisional, continuation, reissue and other applications for Letters Patent on said improvements and all assignments thereof to said assignee or its assigns, to communicate to said assignee or its representatives all facts known to the undersigned respecting said improvements, whenever requested, to testify in any interfarences or other legal proceedings in which any of said applications or patents may become involved, to sign all lawful papers, make all rightful calhe, and to do generally everything necessary to aid assignee, its successors, assigns and nominees to obtain patent protection for said improvements in all countries, the expenses incident to sai		
And I do hereby authorize my attorneys to insert on this deed the when known.	e filing date and application number of said application	
2011 1/26		
Date	Sung-Shik EOM	
Witness MININGSAM LEF Typed Warne of Witness		
x *Total of 8 forms are submitted.		
x *Total of 8 forms are submitted.		

PATENT Chara REEL: 031663 FRAME: 0221

	former PTO/SQ/15 (8-00) Modified LDLKs. Docket Number (Optional)
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON
Whereas, t, Yong-Jin Choe	of
207-302, Expo Apt., Jeonmin-dong, Yuseong-gu, Dae	jeon 305-761, Republic of Korea
hereafter referred to as assignor, have with others invented certain	kin new and useful improvements in
APPARATUS FOR PRODUCING ALCHOLS FROM C	· · · · · · · · · · · · · · · · · · ·
for which an application for a United States Letters Pate Application Number	
for which an application for a United States Letters Pater	t was executed by me on
x for which an International Application was filed on	January 15, 2010 , as
PCT/KR2010/000283 , designating the United	States.
And	
Whereas, LG Cham, Ltd. a corporation of Korea, Republic of herein referred to as "assign	na" where mailing addrage is
LG Twin Towers; 20, Yeouido-dong; Yeongdoungpo-gu; Se	oul; REPUBLIC OF KOREA 150-721
is desirous of acquiring the entire right, title and interest in the sa	
is acknowledged, and other good and valuable consideration, I assignee my entire right, title and interest for the United State invention and the aforesald utility patent application and all of applications and patents applied for or granted therefor in the said invention, including without limitation all applications and pithe aforesaid utility application pursuant to any law or treaty, are infringement with the right to sue for and collect the same for its legal representatives, and including the right to claim such price. Trademarks is hereby authorized and requested to issue all passignee herein, as assignee of the entire interest the representatives, heirs and assigns do hereby agree and covenal all original, divisional, continuation, release and other applications assignments thereof to said assignee or its assigns, to communication to the undersigned respecting said improvements, when legal proceedings in which any of said applications or patents may rightful caths, and to do generally everything necessary to all obtain patent protection for said improvements in all countries, that and paid by said assignee.	as of America and all other countries in and to said original, divisional, continuation, substitute or reissue. United States of America and all other countries, for etents for said invention claiming priority or benefit of id including all claims for damages by reason of past own use and the use of its successors, assigns and only or benefit and the Commissioner of Patents and items on said improvements or resulting therefrom to herein; and the undersigned for me and my legal int without further remuneration, to execute and deliver ons for Letters Patent on said improvements and all nicate to said assignee or its representatives all facts aver requested, to testify in any interferences or other ay become involved, to sign all lawful papers, make all I assignee, its successors, assigns and nominees to the expenses incident to said applications to be borne
And I do hereby authorize my attorneys to insert on this deed the when known.	a filing date and application number of said application
Jan 26 2011	Ethan
Date	Yong-Jin Choe
Witness Myung Sam FF Typed Name of Witness	

ASSIGNMENTS DOC

1.f)-3151

*Total of

*\$*75

forms are submitted.

	former PTO/SB/15 (8-00) Modified LDLKs.i
	Docket Number (Optional)
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON
Whereas, I, Chan-Hong Lee 201-705. Kyungnam Hornorsvill. Daedcok Techno Valley Dacicon 305-792. Republic of Korea hereafter referred to as assignor, have with others invented cert APPARATUS FOR PRODUCING ALCHOLS FROM for which an application for a United States Letters Pate Application Number for which an International Application was filed on PCT/KR2010/000283 , designating the United And Whereas, LG Chern, Ltd. a corporation of Korea, Republic of herein referred to as "assigned as a comporation of Korea, Republic of herein referred to as "assigned as a comporation of Korea, Republic of herein referred to as "assigned as a composition of the sum o	tain new and useful improvements in OLEFINS Itent was filed on
And I do hereby authorize my attorneys to insert on this deed the	ne filing date and application number of said application
when known.	c/ // -
2.11/2/1	Cha to Co
Date	Chan-Hong Lee
Myngsom LEF Typed Marne of Witness	

PATENTS Charge REEL: 031663 FRAME: 0223

*Total of

forms are submitted.

X.

1-D-315\

	furmer PTO/58/15 (6-00) Modified LOUKAN
	Docket Number (Optional)
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON
Whereas, I, Moo-Ho Hong	of
304-602, Paragon Apt., Tacpycong 2(i)-dong, Jung-gu	Daejeon 301-784, Republic of Korea
hereafter referred to as assignor, have with others invented certain	ain new and useful improvements in
APPARATUS FOR PRODUCING ALCHOLS FROM C	LEFINS
for which an application for a United States Letters Pate Application Number	ent was filed on Currently Herewith
for which an application for a United States Letters Pater	t was executed by me on
x for which an International Application was filed on	
PCT/KR2010/000253 , designating the United	States.
And	
Whereas, LG Chem, Ltd.	no " where welling address is
a conporation of Korea. Republic of herein referred to as "assign LG Twin Towers, 20, Yeouldo-dong; Yeongdeungpo-gu; Se	oul: REPUBLIC OF KOREA 150-721
Is desirous of acquiring the entire right, title and interest in the se	ame;
assignee my entire right, title and interest for the United State invention and the aforesaid utility patent application and all capplications and patents applied for or granted therefor in the said invention, including without limitation all applications and puter aforesaid utility application pursuant to any law or treaty, at infringement with the right to sue for and collect the same for it legal representatives, and including the right to dalm such prior trademarks is hereby authorized and requested to issue all passignes herein, as assigned of the entire Interest the representatives, heirs and assigned to hereby agree and covena all original, divisional, continuation, reissue and other applications assignments thereof to said assigned or its assigns, to communication to the undersigned respecting said improvements, when legal proceedings in which any of said applications or patents mightful oaths, and to do generally everything necassary to all obtain patent protection for said improvements in all countries, and paid by said assignee.	United States of America and all other countries, for latents for said invention claiming priority or benefit of ad including all claims for damages by reason of past is own use and the use of its successors, assigns and only or benefit and the Commissioner of Patents and active to be easily and the undersigned for me and my legal int without further remuneration, to execute and deliver one for Letters Patent on said improvements and all incate to said assigned or its representatives all facts ever requested, to testify in any interferences or other as processors, assigns and nominees to the expenses incident to said applications to be borne to the expenses incident to said applications to be borne.
And I do hereby authorize my attorneys to insert on this deed the	e filing date and application number of said application
when known.	
2011 1/16	100
Date	Moo-Ho Hong
Witness Muning sam FF Typed Mame of Witness	

X *Total of 8 forms are submitted.

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	former PTO/SB/15 (8-00) Modified LDLK&M
A A A A A A A A A A A A A A A A A A A	Docket Number (Optional)
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON
Whereas, I, O-Hak Kwon 108-102, Sang-a Apt., Mannyeon-dong, Seo-gu, I hereafter referred to as assignor, have with others invented certal APPARATUS FOR PRODUCING ALCHOLS FROM Comparison of the for which an application for a United States Letters Pater Application Number for which an application for a United States Letters Pater of which an International Application was filed on PCT/KR2010/000283 and designating the United And Whereas, LG Chem, Ltd.	of Dacicon 302-739, Republic of Korea ain new and useful improvements in DEFINS ent was filed on Currently Herewith I was executed by me on January 15, 2010 as States.
a corporation of Kores, Republic of herein referred to as assign	ee" whose mailing address is
LG Twin Towers; 20, Yeouldo-dong; Yeongdeungpo-gu; Se	
is desirous of acquiring the entire right, title and interest in the sa	me:
is acknowledged, and other good and valuable consideration, is assignee my entire right, title and interest for the United State invention and the aforesaid utility patent application and all capplications and patents applied for or granted therefor in the said invention, including without limitation all applications and pithe aforesaid utility application pursuant to any law or treaty, at infringement with the right to sue for and collect the same for its legal representatives, and including the right to claim such price trademarks is hereby authorized and requested to issue all psicald assignee herein, as assignee of the entire interest the representatives, helrs and assigns do hereby agree and covenal all original, divisional, continuation, reissue and other applications assignments thereof to said assignee or its assigns, to communication to the undersigned respecting said improvements, when legal proceedings in which any of said applications or patents may rightful oaths, and to do generally everything necessary to alcoholin patent protection for said improvements in all countries, that paid by said assignee.	is of America and all other countries in and to sald riginal, divisional, continuation, substitute or reissue United States of America and all other countries, for stents for said invention claiming priority or benefit of id including all claims for damages by reason of past is own use and the use of its successors, assigns and with or benefit and the Commissioner of Patents and tents on said improvements or resulting therefrom to serein; and the undersigned for me and my legal at without further remuneration, to execute and deliverons for Letters Patent on said improvements and all allocate to said assignee or its representatives all facts aver requested, to testify in any interferences or other by become involved, to sign all lawful papers, make all assignee, its successors, assigns and nominees to the expenses incident to said applications to be borne.
And I do hereby authorize my attorneys to insert on this deed the when known.	4.
Heb. 5/ 2011	Kuon
Dale	O-Hak Kwon
Witness Viness Viness Viness Viness	
x *Total of 8 forms are submitted.	

ASSIGNMENTS.DOC

PATENTS SEED: 031663 FRAME: 0225

	Dacket Number (Optional)	
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON	
Whereas, I, Dac-Chul Kim of		
108-803, Sang-a Apt., Mannyeon-dong, Seo-gu, I	Daejeon 302-739, Republic of Korea	
hereafter referred to as assignor, have with others invented certain		
APPARATUS FOR PRODUCING ALCHOLS FROM OLEFINS		
for which an application for a United States Letters Patent was filed on Currently Herewith Application Number		
for which an application for a United States Letters Patent was executed by me on		
x for which an International Application was filed on	<u>January 15, 2010</u> , as	
PCT/KR2010/000283 designating the United	States.	
And		
Whereas. <u>LG Chern, Ltd.</u> a corporation of <u>Korea, Republic of</u> herein referred to as "assign	se" whose mailing address is	
LG Twin Towers; 20, Yeouido-dong: Yeongdeungpo-gu: Se	oul; REPUBLIC OF KOREA 150-721	
is desirous of acquiring the entire right, title and interest in the se		
NOW, THEREFORE, in consideration of the sum of one dollars (\$ 1.00), the receipt whereof is acknowledged, and other good and valuable consideration. I as assignor hereby sell, assign and set over to said assignee my entire right, title and interest for the United States of America and all other countries in and to said invention and the aforesaid utility patent application and all original, divisional, continuation, substitute or reissue applications and patents applied for or granted therefor in the United States of America and all other countries, for said invention, including without limitation all applications and patents for said invention claiming priority or benefit of the aforesald utility application pursuant to any law or treaty, and including all claims for damages by reason of past intringement with the right to suc for and collect the same for its own use and the use of its successors, assigns and tagat representatives, and including the right to dalm such priority or benefit and the Commissioner of Patents and Trademarks is hereby authorized and requested to issue all patents on said improvements or resulting therefrom to said assignee herein, as assigns do hereby agree and covernant without further remuneration, to execute and deliver representatives, heirs and assigns do hereby agree and covernant without further remuneration, to execute and deliver assignments thereof to said assigns and other applications for Letters Patent on said improvements and all assignments thereof to said assignee or its essigns, to communicate to said assignee or its representatives all facts known to the undersigned respecting said improvements, whenever requested, to testify in any interferences or other legal proceedings in which any of said applications or patents may become involved, to sign all lawful papers, make all rightful oaths, and to do generally everything necessary to aid assignee, its successors, assigns and nominees to obtain patent protection for said improvements in all countries, the expenses inci		
And I do hereby authorize my attorneys to insert on this deed the when known.	e filing date and application number of said application	
Jan 27 2011	Kin	
Date	Dac-Chul Kim	
Myung Sam LEF Typed Warne of Witness		
x Total of 8 forms are submitted.		

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	former PTO/SB/15 (8-00) Modified LTL KEA	
	Docket Number (Optional)	
ASSIGNMENT OF UTILITY APPLICATION	LGCHEM 3.9-160 CON	
Whereas, I. Jae-Hui Choi 205-1405, Expo Apt., Jeonmin-dong, Yuseong-gu, Dereatter referred to as assignor, have with others invented car. APPARATUS FOR PRODUCING ALCHOLS FROM. for which an application for a United States Letters Parapplication Number. for which an application for e United States Letters Pate. X for which an International Application was filed on PCT/KR2010/000283. designating the United And. Whereas, LG Chem, Ltd. a corporation of Korea, Republic of herein referred to as "assignation of Korea, Republic of herein referred to as "assignation."	of Dacjeon 305-761, Republic of Koréa Itain new and useful improvements in OLEFINS Itent was filed on	
LG Twin Towers; 20 Yeouldo-dong; Yeongdeungpo-gu; S	eoul; REPUBLIC OF KOREA 150-721	
Is desirous of acquiring the entire right, title and interest in the		
NOW. THEREFORE, in consideration of the sum of one dollars (\$ 1.00), the raceipt whereof is acknowledged, and other good and valuable consideration, I as assignor hereby sell, assign and set over to said assignee my entire right, title and interest for the United States of America and all other countries in and to said invention and the aforesaid utility patent application and all original, divisional, continuation, substitute or reissue applications and patents applied for or granted therefor in the United States of America and all other countries, for said invention, including without limitation all applications and patents for said invention claiming priority or benefit of the aforesaid utility application pursuant to any law or treaty, and including sit claims for damages by reason of past infringement with the right to sue for and collect the same for its own use and the use of its successors, assigns and legal representatives, and including the right to claim such priority or benefit and the Commissioner of Patents and Trademarks is hereby authorized and requested to issue all patents on said improvements or resulting therefrom to said assignee herein, as assignee of the entire interest therein; and the undersigned for me and my legal representatives, heirs and assigns do hereby agree and covenant without further remuneration, to execute and deliver all original, divisional, continuation, reissue and other applications for Letters Patent on said improvements and all assignments thereof to said assignee or its assigns, to communicate to said assignee or its representatives all facts known to the undersigned respecting said improvements, whenever requested, to testify in any interferances or other legal proceedings in which any of said applications or patents may become involved, to sign all lawful papers, make all rightful caths, and to do generally everything necessary to aid assignee, its successors, assigns and nominees to obtain patent protection for said improvements in all countries, the expenses in		
And I do hereby authorize my attorneys to insert on this deed when known.	the filing date and application number of said application	
Jan 26 2011	(then)	
Date	Jae-Hui Choi	
Mynn & Sam LET Typed Name of Witness		
Total of 8 torms are submitted.		

PATENT Schemen

RECORDED: 11/07/2013

LD-515\