

Bogotá, 1 de junio de 2018

Doctor
JOSE LUIS SALAZAR LÓPEZ
Director Nuevas Creaciones
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO -SIC-
E. S. D.

REF.: SOLICITANTE: PI INDUSTRIES LTD

**TITULO: "PROCESO PARA LA PREPARACIÓN
DE ALQUILEN BIS-DITIOFOSFATOS"**

EXPEDIENTE: NC2018/0003434

**RESPUESTA AL EXAMEN DE FORMA NOTIFICADO MEDIANTE EL OFICIO
No. 3748**

HELENA CAMARGO WILLIAMSON, mayor de edad y vecina de Bogotá D.C., identificada como aparece al pie de mi firma, en mi condición de apoderada de la sociedad **PI INDUSTRIES LTD**, organizada y existente de acuerdo con las leyes de la India, me dirijo a usted respetuosamente con el fin de dar respuesta al examen de forma dentro del término legal establecido en el artículo 39 de la Decisión 486 de la Comisión de la Comunidad Andina.

1. Análisis de prioridad (Art. 10 D486)

El examinador requiere *"presentar antes de dieciséis meses contados desde la fecha de presentación de la solicitud cuya prioridad se invoca, copia certificada, por la autoridad que la expidió, certificado de su fecha de presentación, expedido por la misma autoridad y documento traducido al idioma español"*.

Con el fin de brindar la información necesaria respecto a la prioridad, el solicitante procede a adjuntar junto con este memorial la copia certificada por la autoridad de India, así como su correspondiente traducción al español.

2. Poder (Art. 26 D 486, literal f)

El examinador solicita *"allegar el poder otorgado al abogado que aparece en la solicitud como apoderado."*

En cumplimiento de las disposiciones establecidas en el artículo 26 de la Decisión 486 de la Comisión de la Comunidad Andina, me permito adjuntar el poder otorgado por parte de la sociedad **PI INDUSTRIES LTD.**

3. Cesión (Art. 26 D 486, literal k)

El examinador manifiesta que *“La solicitud no contiene la copia del documento en que consta la cesión del derecho a la Patente de Invención del inventor al solicitante o a su causante”*.

En cumplimiento de las disposiciones establecidas en el artículo literal k) de la Decisión 486 de la Comisión de la Comunidad Andina, me permito adjuntar copia del documento de cesión, con su correspondiente traducción al español.

4. Reivindicaciones (Art. 30 D486)

El examinador objeta la reivindicación 1, indicando que *“No es clara, porque se refiere a un procedimiento pero en éste sólo se indica una única etapa de reacción; las características esenciales de un método se definen mediante una secuencia lógica de etapas y las condiciones técnicas específicas que intervienen en ellas. Se requiere hacer la modificación pertinente”*. Además, *“No es concisa, porque siendo un proceso se están definiendo las características de los compuestos que intervienen en la síntesis, pero no se define un compuesto como tal que intervenga en la misma, nuevamente se le recuerda al solicitante, que una reivindicación del tipo proceso se debe definir por la secuencia de etapas y las condiciones técnicas que están involucradas en dichas etapas”*.

En respuesta a la primera objeción de la reivindicación 1 de falta de claridad, el solicitante respetuosamente sostiene que el proceso de síntesis reivindicado en la reivindicación 1 es una reacción denominada reacción-en-un-solo-recipiente (*one-pot reaction*) en el que unos reactivos de partida que se encuentran definidos se hacen reaccionar en unas condiciones que están también definidas, de temperatura, atmósfera inerte y presión para dar el producto final, también definido. Por lo tanto, la secuencia de pasos y las condiciones técnicas que están implicadas en esta reacción, es que los dos reactivos de partida se mezclan para obtener primero una mezcla de reacción. A continuación se purga un gas inerte en la mezcla de reacción para conseguir una atmósfera inerte y una presión de 0,5 a 3 kg/cm². La mezcla de reacción se calienta a continuación a una temperatura de entre 50 y 120 °C durante la cual la presión aumenta a un rango de 3 a 15 kg /cm². Bajo estas condiciones de temperatura y presión, la reacción se continúa durante 6 a 15 horas para obtener un producto crudo de fórmula I que luego se aísla.

Por otro lado, el examinador indica que *“Las reivindicaciones 1, 3 y 4 no son claras, porque se emplean los términos: “al menos un y opcionalmente” son imprecisos, lo cual no permite distinguir la invención del estado de la técnica. Se sugiere sustituirlos por términos precisos o rangos concretos”*.

A la anterior objeción a las reivindicaciones 1, 3 y 4 de falta de claridad, se modifican de manera apropiada, eliminando el término “*opcionalmente*”. No obstante discrepamos de la alegada falta de claridad del término “*al menos*” que se mantiene en algunas reivindicaciones.

El término “*al menos*” significa lo mismo que la expresión “*uno o más*”, y puede ser amplio, pero no es impreciso. En contra de la opinión del Examinador este término no es impreciso, porque permite una comparación con el estado de la técnica de forma que por ejemplo un documento que divulgase la característica de “*ninguno*” (0), se podría comparar con la materia-objeto de las reivindicaciones y claramente no caería dentro de la característica “*uno o más*”. Cualquier otro número por ejemplo 1, 3, 7 o 100 sí caerían dentro de dicha característica y la anticiparían. Por ello este término es amplio lo cual no significa que no sea claro, ya que sí permite la comparación con el estado de la técnica.

No sólo aparece en multitud de patentes concedidas en numerosos países, sino también en varias patentes concedidas en Colombia (por ejemplo No. 14-065.568) dirigida a un procedimiento (véase reivindicación 1) o la No. 13-126.418 (véase por favor la reivindicación 1 que contiene hasta tres “*al menos*”):

1. Electrodo para evolución de productos gaseosos en celdas electrolíticas constituido por un substrato metálico revestido con al menos una primera composición catalítica y al menos una segunda composición catalítica, dicha primera composición catalítica comprendiendo una mezcla de óxidos de iridio, de rutenio y de al menos un metal de válvula y siendo exenta de estaño, dicha segunda composición catalítica comprendiendo una mezcla de óxidos de iridio, de rutenio y de estaño, dicha primera y segunda composición catalítica aplicadas en dos o más capas alternadas.

Asimismo, manifiesta que “*Las reivindicaciones 1, 4 y 6 no son concisas, porque emplean los conectores “y/o” u “o”, lo cual indica que es alternativo emplear una u otra opción. Se requiere al solicitante cambiarlos*”.

En respuesta a la objeción de las reivindicaciones 1, 4 y 6 por no ser concisas, se han modificado como se señala a continuación.

El conector “y/o” se ha eliminado, aunque en nuestra opinión su presencia no supone falta de concisión. Sin embargo, el término “o”, se mantiene en algunas reivindicaciones porque discrepamos de la opinión del examinador al respecto. De hecho existen patentes concedidas en Colombia que la contienen porque indica claramente dos realizaciones perfectamente claras y definidas.

Así por ejemplo se encuentra en la patente concedida de la solicitud No. 14-168341:

1. Placa de yeso que tiene un núcleo de yeso con uno o ambos lados cubiertos por una tela no tejida, en donde dicha tela no tejida tiene 2 lados, un lado interno, que está en contacto con el núcleo de yeso, y un lado externo, que no está en contacto con el núcleo de yeso, caracterizada porque - el lado interno de la tela no tejida comprende un

estampado que tiene una rugosidad de superficie Ra de 25 a 60 micrómetros; y.etc.

Se puede ver cómo la reivindicación, o dicho de otra forma la invención definida en la reivindicación contempla dos realizaciones y por ello incluye el término "o": Una en la que el núcleo de yeso tiene un lado cubierto y otra en la que el núcleo de yeso tiene los dos. Pero que la invención definida en la reivindicación, contemple dos realizaciones no constituye ninguna falta de claridad de la placa de yeso que se reivindica y define.

En el caso presente por ejemplo en la reivindicación 1, las expresiones "*cuando n es mayor que 1, x^1 y x^2 pueden estar unidos al mismo átomo de carbono o a diferentes átomos de carbono*", y "*R³ y R⁴ pueden estar unidos al mismo átomo de carbono o a diferentes átomos de carbono*" tiene el término "o", lo cual significa que la reivindicación define las dos realizaciones del proceso de preparación de un compuesto de fórmula I. Por tanto, esta expresión no se modifica.

Por último considera que "*La reivindicación 4 no es clara, porque se emplean expresiones negativas: "el halógeno no sea bromo", no es una característica esencial de la invención, ya que no se define el compuesto por lo que no tiene. Se solicita emplear expresiones positivas*". Añade que "*Las reivindicaciones deben ser claras y concisas en sí mismas*". Respecto a esta última objeción, la reivindicación 4 se ha modificado para eliminar la expresión negativa.

Después de realizar las modificaciones pertinentes según las observaciones y sugerencias del Examinador y teniendo en cuenta que se ha dado cumplimiento a los requerimientos de ese Despacho, solicito de manera respetuosa que se proceda con la publicación de la solicitud y como resultado de ello se proceda a emitir el examen de fondo de esta solicitud.

Del Señor Director,

POSSE HERRERA RUIZ



HELENA CAMARGO WILLIAMSON
C.C 35.455.268 de Bogotá
T.P. 76.985

Anexo: Formulario Modificaciones
 Capítulo reivindicatorio con control de cambios
 Capítulo reivindicatorio limpio
 Poder
 Cesión
 Traducción de la cesión
 Documento de prioridad
 Traducción del documento de prioridad

**DELEGATURA PROPIEDAD INDUSTRIAL
MODIFICACIONES Y/O CORRECCIONES A SOLICITUDES EN TRÁMITE**

1. TIPO DE SOLICITUD

☒ **MODIFICACIÓN**

☐ **CORRECCIÓN**

1.1 IDENTIFICACIÓN DEL TRÁMITE

- ☒ Patente de invención/PCT
☐ Patente Modelo de Utilidad/PCT
☐ Diseño Industrial
☐ Esquema de Trazado Circuitos Integrados

2. DATOS DEL SOLICITANTE

☐ Persona Natural

☒ Persona Jurídica

PI INDUSTRIES LTD

NOMBRE O DENOMINACIÓN/NOMBRE O RAZÓN SOCIAL COMPLETA

DIRECCIÓN

No. TELÉFONO

CIUDAD

Rajasthan, India

CORREO ELECTRÓNICO

DEPARTAMENTO/ESTADO

NACIONALIDAD O

PAÍS DE RESIDENCIA

LUGAR DE CONSTITUCIÓN

3. DATOS DEL APODERADO

APELLIDOS		NOMBRES	IDENTIFICACIÓN	
CAMARGO WILLIAMSON		HELENA	C.C. 35.455.268 de Bogotá	T.P. 76985
DIRECCIÓN	Carrera 7 No. 71-52 Torre A, Piso 5		No. TELÉFONO	3257300
CIUDAD	Bogotá D.C.		CORREO ELECTRÓNICO	notipi@phrlegal.com
PAÍS	Colombia		No. RADICACIÓN DE PROTOCOLO DE PODER GENERAL	

4. MODIFICACIÓN Y/O CORRECCIÓN SOLICITADA

(Código actuación SIC - 608)

EXPEDIENTE No. **NC2018/0003434**

- ☐ Capítulo Descriptivo
- ☒ Capítulo Reivindicatorio
- ☐ Resumen
- ☐ Modificación Título

5. MODIFICACIÓN Y/O CORRECCIÓN SOLICITADA

(Código actuación SIC - 587)

- | | | |
|--|---|--|
| ☐ Cesión/Cambio Solicitante | ☐ Cambio de Nombre | ☐ Cambio de Domicilio |
| ☐ Cambio de Dirección | ☐ Nombre Inventor | ☐ Momento Publicación |
| ☐ Otra: Especifique: _____ | | |

6. ANEXOS:

- ☐ Comprobante de pago de la tasa para la presentación de la modificación.
- ☒ Poder, si fuere el caso.
- ☐ Documento que legalmente pruebe la cesión del inventor al solicitante o a su causante.
- ☒ Documento que contiene las modificaciones y/o correcciones

7. FIRMA DEL SOLICITANTE, DEL APODERADO O DEL REPRESENTANTE LEGAL

Junto a cada firma, indicar el nombre del firmante y su calidad (si tal calidad no es obvia al leer el petitorio)

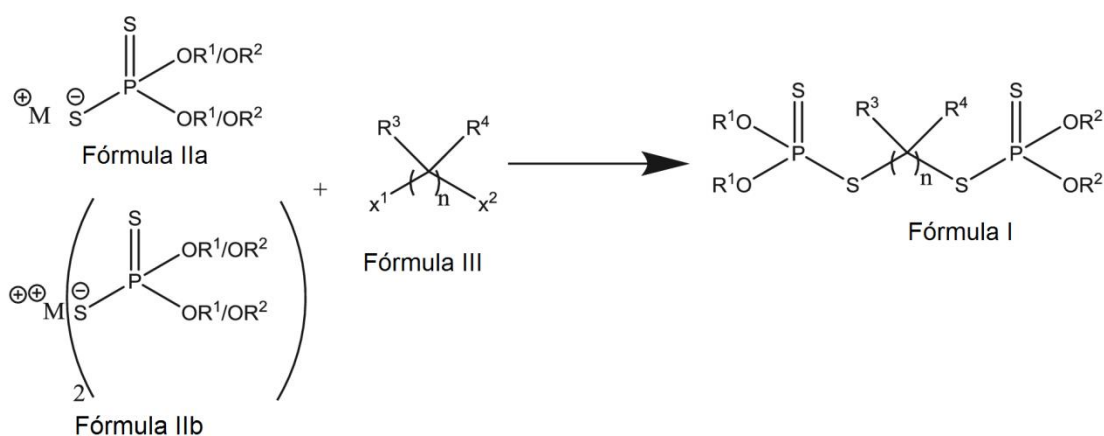


HELENA CAMARGO WILLIAMSON
APODERADO
C.C. 35.455.268 T.P. 76985

REIVINDICACIONES

1. Un proceso para preparar un compuesto de Fórmula I; ~~dicho proceso~~ que comprende las una etapas de:

a) obtener una mezcla reacción de un compuesto de Fórmula IIa o Fórmula IIb y un agente de inserción de alquileo de Fórmula III ~~a una temperatura que oscila de 10 a 120 °C, a una presión que oscila de 2,5 a 15 kg/cm² y en atmósfera inerte,~~



en la que,

x¹ y x² se seleccionan independientemente del grupo que comprende halógeno, mesilato y triflato, n es 1 a 3;

R¹ y R² ~~se seleccionan~~ se seleccionan independientemente ~~del grupo que comprende~~ alquilo C₁-C₅ y alquilo C₁-C₅ con de 1 a 3 sustituyentes que se seleccionan de cloro, bromo, yodo, OH, -CN, -NO₂, -CHO, -COOH y -COOR¹ opcionalmente sustituido;

R³ y R⁴ ~~se seleccionan~~ se seleccionan independientemente ~~del grupo que comprende~~ hidrógeno, o alquilo C₁-C₅, alquilo C₁-C₅ con de 1 a 3 sustituyentes que se seleccionan de cloro, bromo, yodo, OH, -CN, -NO₂, -CHO, -COOH y -COOR¹ y un anillo de 3 a 7 miembros formado por opcionalmente sustituido, o

R³ y R⁴ junto con los átomos de carbono a los que están unidos ~~forman un anillo carbocíclico o heterocíclico de 3 a 8 miembros;~~

M se selecciona de entre es un catión inorgánico, NH₄⁺ y Ø un catión orgánico; y

cuando n es mayor que 1, x¹ y x² pueden estar unidos al mismo átomo de carbono o a átomos de carbono diferentes, y R³ y R⁴ pueden estar unidos al mismo átomo de carbono o a átomos de carbono diferentes.

b. poner la mezcla de reacción bajo atmósfera inerte a una presión de entre 0.5 y 3.0 kg/cm²;

c. calentar la mezcla de reacción a una temperatura entre 50 y 120 °C y una presión entre 2.5 y 15 kg/cm²; y

d. agitar la mezcla de reacción por un periodo de entre 6 a 15 horas para obtener el compuesto de fórmula I.

2. El proceso de acuerdo con la reivindicación 1, en el que la reacción se lleva a cabo en presencia de al menos un catalizador seleccionado del grupo que comprende ácido para-tolueno sulfónico, bromuro de butil amonio terciario, dimetilformamida, bromuro de sodio, yodo y yoduro de sodio~~temperatura oscila de 50 a 120 °C.~~

3. El proceso de acuerdo con la reivindicación 1, en el que

- la relación del compuesto de Fórmula IIa o IIb al agente de inserción de alquileo de Fórmula III está comprendida entre ~~oscila de~~ 1: 0,5 a 1:10,
- la temperatura está comprendida entre ~~oscila de~~ 70 a 95 °C y la presión está comprendida entre ~~oscila de~~ 5 a 10 kg/cm², y
- la atmósfera inerte se mantiene usando al menos con un gas inerte seleccionado del grupo que consiste en nitrógeno, argón y mezclas de nitrógeno y argón;
- la reacción se lleva a cabo durante un periodo de entre 6 a 15 horas.

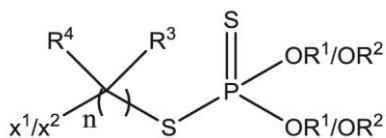
4. El proceso de acuerdo con la reivindicación 1, en el que x^1 y x^2 son independientemente halógeno, el halógeno que se selecciona entre cloro, bromo y, yodo, con la condición de que cuando R^3 y ~~o~~ R^4 son ~~es~~ hidrógeno, el halógeno se selecciona de cloro y yodo ~~sea bromo~~;
- n es 1 a 2;
- R^1 y R^2 se seleccionan ~~son~~ independientemente del grupo que comprende alquilo C_1-C_4 y alquilo C_1-C_4 con de 1 a 3 sustituyentes que se seleccionan de cloro, bromo, yodo, OH, -CN, -NO₂, -CHO, -COOH y -COOR¹ opcionalmente sustituido;
- R^3 y R^4 se seleccionan ~~son~~ independientemente del grupo que comprende hidrógeno, ~~o alquilo C_1-C_3 y alquilo C_1-C_3 con de 1 a 3 sustituyentes que se seleccionan de cloro, bromo, yodo, OH, -CN, -NO₂, -CHO, -COOH y -COOR¹ opcionalmente sustituido;~~
- ~~cuando n es mayor que 1, x^1 y x^2 pueden estar unidos al mismo átomo de carbono o a átomos de carbono diferentes, y R^3 y R^4 pueden estar unidos al mismo átomo de carbono o a átomos de carbono diferentes;~~ y
- M es un catión inorgánico o NH₄.
5. El proceso de acuerdo con la reivindicación 1, en el que x^1 y x^2 son independientemente cloro, yodo o flúor,
- n es 1,
- R^1 y R^2 son alquilo C_1-C_2 ,
- R^3 y R^4 son hidrógeno, y
- M es Na o K.
6. El proceso de acuerdo con la reivindicación 1, en el que el compuesto de Fórmula I es tetraetil metilen-bis-ditiofosfato, el compuesto de Fórmula IIa se selecciona entre la sal sódica de O,O'-dietil ditiofosfato o la sal potásica de

O,O'-dietil ditiofosfato y el compuesto de Fórmula III se selecciona del grupo de dicloruro de metileno, diyoduro de metileno y difluoruro de metileno.

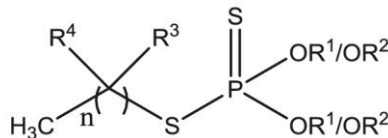
7. El proceso de acuerdo con la reivindicación 1, que comprende las etapas previas de cargar el compuesto de Fórmula IIa o IIb y el agente de inserción de alquileo de Fórmula III a una temperatura que oscila de comprendida entre 10 a 50 °C en un recipiente y el cierre del recipiente, pasando un gas inerte para obtener una presión en el intervalo de 0,5 a 3,0 kg/cm² y calentando la mezcla en el contenedor.

8. El proceso de acuerdo con la reivindicación 1, que comprende las etapas de enfriar la mezcla de reacción, lavar con solución acuosa que contiene al menos una base, separar la fase orgánica que comprende el compuesto de Fórmula I, y destilar la fase orgánica para obtener el compuesto de Fórmula I en el que los sustituyentes del grupo alquilo se seleccionan del grupo que consiste en Cl, Br, I, OH, CN, NO₂, CHO, COOH y COOR[±].

9. El compuesto de Fórmula I obtenido mediante el proceso de acuerdo con la reivindicación 1, que comprende el compuesto de Fórmula IV en el intervalo del 0,05 al 0,5 % y el compuesto de Fórmula V en el intervalo del 0,05 al 1,0 %,



Fórmula IV



Fórmula V

10. El compuesto de Fórmula I obtenido por el proceso de acuerdo con la reivindicación 1.

ASSIGNMENT OF RIGHT IN INVENTION

WHEREAS, we :

1. **Anuj Kumar Mittal, aged about 50 years, S/o Dr. Ravindra Prakash Mittal, an Indian citizen, of Flat No. - A-3 Vallabh Empire, Navratan Complex, Bhuwana Udaipur -313001, Rajasthan, INDIA**
2. **Nitin Jaikant Malviya, aged about 40 years, S/o Jaikant B. Malviya, an Indian citizen, of 844 Gyan Nagar, Hiran Magari, Sect 4, Udaipur, 13001, Rajasthan, INDIA**
3. **Devendra Singh Dalawat, aged about 41 years, S/o Khuman Singh, an Indian citizen, of 13C, Santosh Nagar, Gariyawas, Road No. 07, Udaipur - 313001, Rajasthan, INDIA**
4. **Murli Dhar Soni, aged about 38 years, S/o Motilal Soni, an Indian citizen, of 117- Shiv Nagar, Gariyawas, Opposite Mahaveer academy School, Udaipur -313001, Rajasthan, INDIA**
5. **Adi Narayana Sanniboina aged about 31 years, S/o Appayya Sanniboina, an Indian citizen, 115A- Subhash Nagar, Udaipur -313001, Rajasthan, INDIA**
6. **Krishna Kant Dashora, aged about 31 years, S/o Bhagwan Lal Dashora, an Indian citizen, of C-21, Udai Vihar, Riico Colony, Madri Industrial Area, Udaipur -313001, Rajasthan, INDIA**

employees of **PI Industries Ltd.**, a company organized and existing under the laws of India of having registered office at 20, Udaisagar road, Udaipur, Rajasthan, India and one of its offices at **5th floor, Vipul Square, B Block, Sushant Lok, Phase - 1, Gurgaon-122009, India** (hereinafter referred to as "**INVENTORS/ ASSIGNORS**") collectively and individually as "Inventor/Assignor") have made an invention for "**A PROCESS FOR PREPARING ALKYLENE BIS-DITHIOPHOSPHATES**"

AND, WHEREAS, **PI Industries Ltd.**, (hereinafter referred to as "**APPLICANT/ ASSIGNEE**"), are desirous of acquiring the entire right, title & interest in and to said invention in India and worldwide from the Inventors.

NOW, THEREFORE, TO ALL WHOM IT MAY CONCERN, BE IT KNOWN, we the "INVENTORS" in view of our employment contract with the ASSIGNEE have assigned our rights in the invention to the ASSIGNEE and we the ASSIGNORS have sold, assigned, transferred and conveyed and by these presents do hereby sell, assign transfer and convey to APPLICANT, its successors, legal representatives, the entire right, title and interest in and to said invention for obtaining Letters Patent throughout the world, in respect of Indian Patent Application No. 201711011197 dated March 29, 2017 which may be obtained thereupon and in and to all extensions, renewals and reissues thereof including the right to claim International Convention priority or of any other country which may be obtained on any of the said Patent and Patent Applications, including without limitation of generality, any and all choices in action and any and all claims and demands, both at law and in equity, that said Inventors has or may have for damages or profits accrued or to accrue on account of the infringement of any said Patents and Patent Applications, the same to be held and enjoyed by said ASSIGNEE, its successors, legal representatives and assigns, as fully and entirely as the same would have been held and enjoyed by Inventors if this assignment had not been made TO HAVE and TO HOLD the same to the full end of the term for which said Letters Patent may be granted ;

AND, we, the INVENTORS shall do all lawful acts and things, and make execute and deliver any and all other instruments in writing, and any and all further applications, papers, affidavits, assignments, and other documents, which, in the opinion of counsel for said APPLICANT, may be required or necessary more effectively to secure to and vest in said APPLICANT the entire right, title and interest throughout the world in and to said invention, applications, Letters Patent, rights, titles, benefits, privileges and advantages hereby sold, assigned, transferred and conveyed or intended so to be.

Dated this day of , 2018

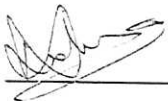
INVENTORS



Anuj Kumar Mittal

Date:

Place: Udaipur



Nitin Jaikant Malviya

Date:

Place: Udaipur



Devendra Singh Dalawat

Date:

Place: Udaipur



Witness 1

Signature

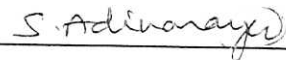
Address Udaipur



Murli Dhar Soni

Date:

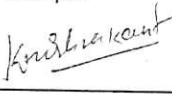
Place: Udaipur



Adi Narayana Sannibonia

Date:

Place: Udaipur



Krishna Kant Dashora

Date:

Place: Udaipur



Witness 2

Signature

Address Udaipur

CESIÓN DE DERECHOS SOBRE INVENCION

CONSIDERANDO QUE nosotros:

1. Anuj Kumar Mittal, de unos 50 años de edad, hijo de Dr. Ravindra Prakash Mittal, ciudadano de la India, de Flat No. – A-3 Vallabh Empire, Navratan Complex, Bhuwana Udaipur -313001, Rajastán, la INDIA
2. Nitin Jaikant Malviya, de unos 40 años de edad, hijo de Jaikant B. Malviya, ciudadano de la India, de 844 Gyan Nagar, Hiran Magari, Sect 4, Udaipur, 13001, Rajastán, la INDIA
3. Devendra Singh Dalawat, de unos 41 años de edad, hijo de Khuman Singh, ciudadano de la India, de 130, Santosh Nagar, Gariyawas, Road No. 07, Udaipur - 313001, Rajastán, la INDIA
4. Murli Dhar Soni, de unos 38 años de edad, hijo de Motilal Soni, ciudadano de la India, de 117- Shiv Nagar, Gariyawas, Opposite Mahaveer academy School, Udaipur - 313001, Rajastán, la INDIA
5. Adi Narayana Sannibonia, de unos 31 años de edad, hijo de Appayya Sanniboina, ciudadano de la India, 115A- Subhash Nagar, Udaipur -313001, Rajastán, la INDIA
6. Krishna Kant Dashora, de unos 31 años de edad, hijo de Bhagwan lal Dashora, ciudadano de la India, de C-21, Udai Vihar, Riico Colony, Madri Industrial Area, Udaipur -313001, Rajastán, la INDIA

empleados de **PI Industries Ltd.**, una sociedad constituida y vigente al amparo de las leyes de la India, con domicilio social en 20, Udaisagar road, Udaipur, Rajastán, la India y una de sus oficinas en 5th floor, Vipul Square, B Block, Sushant Lok, Phase - 1, Gurgaon- 122009, la India (en lo sucesivo denominados conjuntamente **"INVENTORES/CEDENTES"** e individualmente **"Inventor/Cedente"**), hemos realizado una invención para **"UN PROCESO PARA LA PREPARACIÓN ALQUILEN BIS DITIOFOSFATOS"**.

Y CONSIDERANDO QUE **PI Industries Ltd.**, (en lo sucesivo denominada **"SOLICITANTE/CESIONARIO"**) tiene la voluntad de adquirir la totalidad de derechos, títulos e intereses que poseen los Inventores sobre dicha invención en la India y en el mundo entero.

AHORA, POR LO TANTO, A TODOS A QUIENES CORRESPONDA SE HACE SABER QUE nosotros los **"INVENTORES"**, en virtud de nuestro contrato laboral con el **CESIONARIO**, hemos cedido al **CESIONARIO** los derechos que poseemos sobre la invención y nosotros, los **CEDENTES**, hemos vendido, cedido, transferido y traspasado y por el presente documento vendemos, cedemos, transferimos y traspasamos al **CESIONARIO**, sus sucesores y representantes legales la totalidad de derechos, títulos e intereses sobre dicha invención para obtener certificados de patente en todo el mundo, con respecto a la Solicitud de patente de la India n.º 201711011197 con fecha del 29 de marzo de 2017, que puedan obtenerse sobre la misma y sobre todas las ampliaciones, renovaciones y reexpediciones de la misma, incluyendo el derecho a reivindicar prioridad en virtud del Convenio Internacional o de cualquier otro país que pueda obtenerse sobre dicha Patente y Solicitudes de patente, incluyendo, entre otros, todos los derechos de acción y todas y cada una de las reclamaciones, tanto por ley o por equidad, que dichos Inventores tengan o puedan tener por daños o beneficios derivados o que puedan derivarse por una infracción cometida sobre cualquiera de dichas Patentes o Solicitudes de patente; los mismos derechos que ostentará y disfrutará dicho **CESIONARIO**, sus sucesores, representantes legales y causahabientes tan plena y enteramente como los hubieran ostentado

y disfrutado los Inventores de no haberse celebrado esta cesión, y que TENDRÁ y OSTENTARÁ hasta el final del plazo que se hayan concedido para dichos certificados de patente;

Y nosotros, LOS INVENTORES, haremos todo aquello que sea legítimo y formalizaremos y entregaremos todos y cada uno de los instrumentos por escrito, así como todas y cada una de las solicitudes, documentos, declaraciones juradas, cesiones y otros documentos que, a juicio del abogado de dicho SOLICITANTE, puedan ser precisos o necesarios para asegurarle y conferirle al SOLICITANTE de manera más eficaz la totalidad de derechos, títulos e intereses en todo el mundo sobre dicha invención, solicitudes, Certificados de patente, derechos, títulos, beneficios, privilegios y ventajas que por el presente documento se venden, se ceden, se transfieren y se traspasan, o que pretenden venderse, cederse, transferirse y traspasarse.

A fecha de ____ de _____ de 2018.

INVENTORES

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INTELLECTUAL
PROPERTY INDIA

पेटेंट/डिजाइन/ व्यापार
चिह्न/भौगोलिक उपदर्शन



सत्यमेव जयते

भारत सरकार

GOVERNMENT OF INDIA

वाणिज्य एवं उद्योग मंत्रालय

MINISTRY OF COMMERCE & INDUSTRY

पेटेंट कार्यालय

THE PATENT OFFICE

जिस किसी से संबन्धित हो

TO WHOMSOEVER IT MAY CONCERN

मैं, अधोहस्ताक्षरी जो पेटेंट अधिनियम, 1970 की धारा 73(3) के तहत महानियंत्रक एक्सव, अभिकल्प एवं व्यापार चिह्न की ओर से प्रमाणपत्र हस्ताक्षर व जारी करने के लिए प्राधिकृत अधिकारी हूँ, एतद्वारा यह प्रमाणित करता(ती) हूँ कि निम्नलिखित पेटेंट आवेदन के संबंध में फाइल दस्तावेज़(जों) की सही प्रतिलिपि इसके साथ संलग्न है:

I, the undersigned, being an officer duly authorized to sign and issue the certificate on behalf of the Controller General of Patents, Designs and Trademarks in accordance with the provisions of Section 73(3) of the Patents Act, 1970, hereby certify that annexed hereto is a True Copy of the document(s) as filed in connection with the following Patent Application:

क) आवेदन संख्या/ a) Application Number: **201711011197**

ख) फाइल करने की तारीख/ b) Date of Filing: **29th March, 2017**

ग) अनुरोधित दस्तावेज़(जों) का नाम/ c) Name of the document(s) requested:

1) **Application Form-1**

2) **Provisional Specification filed on dated 29th March, 2017 (As per e-filing record)**

यह प्रमाणपत्र पेटेंट अधिनियम, 1970 की धारा 147(1) के अधीन मुझमें निहित शक्तियों के तहत जारी किया गया है/This certificate is issued under the powers vested in me U/S 147(1) of The Patents Act, 1970.

दिनांक/ Dated this **23rd** day of **March, 2018**

(Bimi G.B.)

नियंत्रक पेटेंट व डिजाइन/ Controller of Patents and Designs

(प्राधिकृत हस्ताक्षरी/ Authorised Signatory)

FORM 1 THE PATENTS ACT, 1970 (39 of 1970) & THE PATENTS RULES, 2003 APPLICATION FOR GRANT OF PATENT [See sections 7,54 & 135 and rule 20(1)]	(FOR OFFICE USE ONLY) Application No.:..... Filing Date:..... Amount of Fee Paid:..... CBR No.:..... Signature:.....
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1. APPLICANT(S)

Sr.	Name	Nationality	Address
1	PI Industries Ltd	India	Udaisagar Road, Udaipur- 313001, Rajasthan, INDIA

2. INVENTOR(S)

Sr.	Name	Nationality	Address
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2	NITIN JAIKANT MALVIYA	India	844 Gyan Nagar, Hiran Magari, Sect 4, Udaipur, 13001, Rajasthan,
3	DEVENDRA SINGH DALAWAT	India	13C, Santosh Nagar, Gariyawas, Road No. 07, Udaipur -313001, Rajasthan,
4	MURLI DHAR SONI	India	117- Shiv Nagar, Gariyawas, Opposite Mahaveer academy School, Udaipur -313001, Rajasthan,
5	ADI NARAYANA SANNIBONIA	India	115A- Subhash Nagar, Udaipur -313001, Rajasthan,
6	KRISHNA KANT DASHORA	India	C-21, Udai Vihar, Riico Colony, Madri Industrial Area, Udaipur -313001, Rajasthan,

3. TITLE OF THE INVENTION:A PROCESS FOR PREPARING ALKYLENE BIS-DITHIOPHOSPHATES

4. ADDRESS FOR CORRESPONDENCE OF APPLICANT / AUTHORISED PATENT AGENT IN INDIA

VUTTS & ASSOCIATES LLP, Advocates, No. 704, The Castle, Plot 36-A, Sector 56, Gurgaon – 122009 Haryana, INDIA Tel: +91-(0) 11- 4109 6440 & 4109 6441 Fax No.: +91-(0) 11-4109 6442 Mob. No.: 93128-98660 E-mail. email@vutts.com

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5. PRIORITY PARTICULARS OF THE APPLICATION(S) FILED IN CONVENTION COUNTRY:

Sr.	Country	Application Number	Filing Date	Name of the Applicant	Title of the Invention
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6. PARTICULARS FOR FILING PATENT COOPERATION TREATY (PCT) NATIONAL PHASE APPLICATION

International Application Number	International Filing Date as Allotted by the Receiving Office
PCT//	

7. PARTICULARS FOR FILING DIVISIONAL APPLICATION

Original (first) Application Number	Date of Filing of Original (first) Application
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8. PARTICULARS FOR FILING PATENT OF ADDITION

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Main Application / Patent Number	Date of Filing of Main Application
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9. DECLARATIONS:

(i) Declaration by the inventor(s)

I/We ,ANUJ KUMAR MITTAL,NITIN JAIKANT MALVIYA,DEVENDRA SINGH DALAWAT,MURLI DHAR SONI,ADI NARAYANA SANNIBONIA,KRISHNA KANT DASHORA, is/are the true & first inventor(s) for this invention and declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date:-----

(b) Signature(s) of the inventor(s):.....

(c) Name(s):ANUJ KUMAR MITTAL,NITIN JAIKANT MALVIYA,DEVENDRA SINGH DALAWAT,MURLI DHAR SONI,ADI NARAYANA SANNIBONIA,KRISHNA KANT DASHORA

(ii) Declaration by the applicant(s) in the convention country

I/We, the applicant(s) in the convention country declare that the applicant(s) herein is/are my/our assignee or legal representative.

(a) Date:-----

(b) Signature(s) :.....

(c) Name(s) of the singnatory:PI Industries Ltd

(iii) Declaration by the applicant(s):

- The Provisional specification relating to the invention is filed with this application.
- I am/We are, in the possession of the above mentioned invention.
- There is no lawful ground of objection to the grant of the Patent to me/us.
- I am/We are, the assignee or legal representative to true first inventors.

10. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION:

Sr.	Document Description	FileName
1	PROVISIONAL SPECIFICATION	Form 2 with Provisional Specification.pdf

I/We hereby declare that to the best of my/our knowledge, information and belief the fact and matters stated hering are correct and I/We request that a patent may be granted to me/us for the said invention.

Dated this(Final Payment Date):-----

Signature:.....

Name:PRABHAKAR MANI PRATAP

To The Controller of Patents
The Patent office at NEW DELHI

This form is digitally signed.

FORM 2
THE PATENTS ACT, 1970
(39 of 1970)
&
The Patent Rules, 2003
PROVISIONAL SPECIFICATION
[See Section 10 and Rule 13]

1. TITLE OF THE INVENTION

A process for preparing alkylene bis-dithiophosphates

2. APPLICANTS

- (a) **PI INDUSTRIES LTD.**
- (b) an Indian company,
- (c) of Udaisagar Road, Udaipur- 313001, Rajasthan, INDIA,

3. PREAMBLE TO THE DESCRIPTION

The following specification describes the invention.

FIELD OF THE DISCLOSURE:

The present disclosure relates to a process for preparing alkylene bis-dithiophosphates. The present disclosure particularly relates to a process for preparing tetra-alkyl alkylene bis-dithiophosphates.

5

PRIOR ART AND PROBLEM TO BE SOLVED:

Various processes are reported in the literature for preparing alkylene bis-dithiophosphates, particularly tetra-alkyl alkylene bis-dithiophosphates.

- 10 For instance, RO63381 discloses the use of water as a solvent for the preparation of tetraethyl methylene bis-dithiophosphate by reacting sodium salt of O, O' diethyl dithiophosphoric acid and methylene dichloride. The teachings of RO63381 are directed towards facilitation of the reaction of sodium salt of O,O' diethyl dithiophosphoric acid and methylene dichloride in water medium. The reaction of sodium salt of the O,O' diethyl dithiophosphoric acid and methylene dichloride in water is based on the principle of improved solubility of
- 15 methylene dichloride in water at higher temperature. JP42004454 discloses the process for preparing tetraethyl methylene bis-dithiophosphate by reacting O, O' diethyl dithiophosphate with methylene dichloride in the presence of bromine or iodine compound as a catalyst and water as a solvent.

- The problem with the processes disclosed in RO63381 and JP42004454 is that since it involves the use of water, the full capacity of the manufacturing unit cannot be used efficiently and the process also generates effluent. Further, in
- 20 JP42004454 process, a catalyst is used to drive the reaction which adds up raw material cost.

- Another Romanian patent document RO61710 also discloses the preparation of tetraethyl methylene bis-dithiophosphate by reacting sodium salt of O, O' diethyl dithiophosphoric acid and cyclic methylene sulfate. JP41006735 discloses the preparation of tetraethyl methylene bis-dithiophosphate from O, O' diethyl dithiophosphate and methylene sulfate. However, the reactant cyclic methylene sulfate or methylene sulfate used in
- 25 the processes is not easily accessible and processing effluent containing sulfate increases the cost of operation.

JP09169785 discloses a process for preparing bis(dialkyl dithio phosphato)alkanes by reacting phosphorus pentasulfide, ammonium and dihaloalkane in lower alcohol as a solvent.

- US3014058 discloses a process for preparing tetra-alkyl alkylene bis-dithiophosphate by reacting metal salt of O, O diethyl phosphorodithioate and dibromomethane or bromochloromethane in the presence of inert solvent such as
- 30 alcohol.

FR1231107 discloses the preparation of tetra-alkyl alkylene bis-dithiophosphate by reacting ammonium O, O diethyl phosphorodithioate and dibromomethane in the presence of water as a solvent.

GB845647 discloses the preparation of tetra-alkyl alkylene bis-dithiophosphate by reacting potassium O, O diethyl phosphorodithioate and dibromomethane in the presence of acetone as a solvent.

US2928862 discloses the preparation of 1,4-bis(di-2-butoxyphosphinothioylthio)-2-butene by reacting O, O di-sec-butyl phosphorodithioate and 1,4-dichloro-2-butene in ethanol as a solvent.

- 5 Processes disclosed in the above patent literatures employ at least one solvent to facilitate the reaction. The use of the solvent reduces the output per unit time period and requires processing of the solvent for reuse, the quantity and the quality of which diminishes every reuse.

Therefore, there is a need for a process for preparing alkylene bis-dithiophosphates, particularly tetra-alkyl alkylene bis-dithiophosphates using easily and readily available raw materials without using a solvent.

10

OBJECTS / OBJECTIVES OF THE DISCLOSURE:

Some of the objects of the present disclosure, which at least in one embodiment is adapted to provide, are described herein below:

- 15 It is an object of the present disclosure to provide a process for preparing alkylene bis-dithiophosphates.

It is an another object of the present disclosure to provide a process for preparing tetra-alkyl alkylene bis-dithiophosphates.

It is still another object of the present disclosure to provide a process for preparing tetra-ethyl methylene bis-dithiophosphate.

- 20 It is yet another object of the present disclosure to provide a process for preparing alkylene bis-dithiophosphates which is carried out without using a solvent.

It is further object of the present disclosure to provide a process for preparing alkylene bis-dithiophosphates which is efficient and simple.

- 25 Other objects and advantages of the invention disclosed in the present disclosure will be more apparent from the following description which is not intended to limit the scope of the invention disclosed in the present disclosure.

SUMMARY OF THE DISCLOSURE:

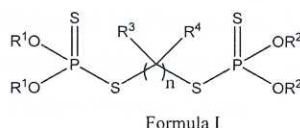
- 30 The present disclosure relates to a process for preparing alkylene bis-dithiophosphates, particularly tetra-alkyl alkylene bis-dithiophosphates by reacting corresponding salt of O, O' dialkyl dithiophosphosphate and alkylene inserting agent.

The prior arts neither disclose nor suggest/teach/motivate to carry the reaction of salt of O, O' dialkyl dithiophosphate and alkylene inserting agent at high temperature and pressure conditions in the presence of inert gas without using a solvent. One of the advantages of the process of the present disclosure is that since the solvent is not used the product output per unit time period is improved and the effluent is not generated, thereby increasing the economics of the operation. This also makes the process environment friendly.

Further, the starting material used for preparing alkylene bis-dithiophosphates is easily available.

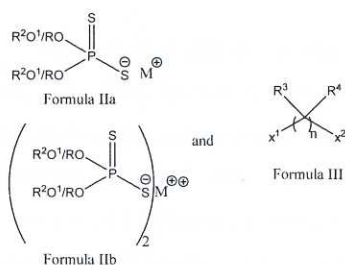
DETAILED DESCRIPTION OF THE DISCLOSURE:

- 10 The present disclosure relates to a process for preparing alkylene bis-dithiophosphates, particularly tetra-alkyl alkylene bis-dithiophosphates of Formula I.



The compound of Formula I is prepared by reacting a compound of Formula IIa or Formula IIb and an alkylene inserting agent of Formula III. The process steps are described herein after.

- 15 Initially, the compound of Formula IIa or IIb and the alkylene inserting agent of Formula III are charged in a container, which can be an autoclave, at a temperature ranging from about 10 °C to about 50 °C. The container is then closed/sealed. An inert gas is passed or purged into the container to obtain an initial pressure in the range of about 0.5 kg/cm² to about 3.0 kg/cm². The ratio of the compound of Formula IIa or IIb to the alkylene inserting agent of Formula III added in the container ranges from about 1:0.5 to about 1:10. It is to be noted here that the ratio
- 20 higher than 1:10 can also be employed with diminishing advantages of the reaction process.



Secondly, the mixture in the container is heated at a temperature ranging from about 50 °C to about 120 °C to obtain a pressure ranging from about 2.5 kg/cm² to about 15 kg/cm².

Though a minute amount of Formula I can be formed at any positive temperature and pressure conditions, to make the reaction commercially and technically viable the reaction of the compound of Formula IIa or Formula IIb and the alkylene inserting agent of Formula III is carried out at a temperature ranging from about 50 °C to about 120 °C and a pressure ranging from about 2.5 kg/cm² to about 15 kg/cm².

- 5 For instance, if the reaction temperature is more than 120 °C then the final product is either likely to decompose or the by-products are likely to be formed in higher amount. Similarly, if the temperature is below 50 °C the product can be formed but the amount formed would be comparatively lower to commercialize the reaction process.

The pressure conditions maintained during the reaction are dependent on the temperature conditions employed and an inert gas used to maintain an inert atmosphere.

- 10 It is well known to a person skilled in the art that as the temperature increases pressure also increases. Therefore, in one of the non-limiting and illustrative embodiments the pressure is about 2.5 kg/cm² when the temperature is about 50 °C. In another such non-limiting embodiment the pressure is about 15 kg/cm² when the temperature is about 120 °C. However, it is to be noted that when the temperature ranges from about 50 °C to about 120 °C it is likely that the pressure can range anywhere from about 2.5 kg/cm² to about 15 kg/cm².

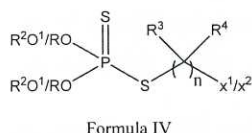
- 15 In one of the preferred embodiments of the present disclosure the reaction of the compound of Formula IIa or Formula IIb and the alkylene inserting agent of Formula III is carried out at a temperature from about 70 °C to about 95 °C and the pressure ranges from about 5 kg/cm² to about 10 kg/cm².

Inert atmosphere is achieved by using an inert gas such as nitrogen and argon. Use of the inert gas avoids the formation of unwanted oxidized by-product that might have formed in the presence of atmospheric oxygen.

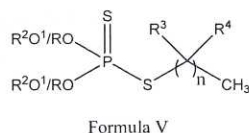
- 20 Secondly, it is hypothesized that the inert gas raises the boiling point of liquid or converted liquid form of the alkylene inserting agent of Formula III, which facilitates the reaction between the two reactants with reduced loss of the low boiling alkylene inserting agent of Formula III.

The reaction of the compound of Formula IIa or Formula IIb and the alkylene inserting agent of Formula III is carried out for a time period ranging from about 6 to about 15 hours.

- 25 Finally, after completion of the reaction the container and the product are cooled and washed with aqueous comprising at least one base. Examples of the base include but are not limited to sodium carbonate, sodium bicarbonate, sodium hydroxide, potassium hydroxide, ammonium hydroxide, potassium carbonate and potassium bicarbonate. An organic layer comprising the compound of Formula I, is separated from the aqueous and distilled to obtain the compound of Formula I. The compound of Formula I obtained by the process of the present disclosure
30 may further comprise impurities of Formula IV and Formula V. The amount of the impurity of Formula IV is about 0.3% and Formula V is about 0.5%. The structures of Formula IV and Formula V are as follows:



and



In order to complete the reaction of a compound of Formula IIa or Formula IIb and alkylene inserting agent of Formula III in reduced time at least one catalyst can be added in the reaction. The catalyst can be added at any stage 5 but necessarily maintaining the inert gas in the container. The catalyst can be a phase transfer catalyst.

Examples of the catalyst useful for the purpose of the present disclosure include but are not limited to para-toluene sulfonic acid, tertiary butyl ammonium bromide, dimethyl formamide, sodium bromide, iodine, sodium iodide and combinations thereof.

The substituents of the compound of Formula I prepared by the process of the present disclosure and the substituents of the compound of Formula IIa or IIb and the compound of Formula III used as reactants for the preparation of the compound of Formula I shall now be described in detail.

The substituents R¹ and R² in the Formula I are independently selected from the group comprising optionally substituted C₁-C₅ alkyl groups. C₁-C₅ alkyl groups of the substituents R¹ and R² in the Formula I include methyl, ethyl, propyl, isopropyl, butyl, secondary butyl, isobutyl, tertiary butyl, pentyl, tertiary pentyl, neopentyl, isopentyl, secondary pentyl and 3-pentyl.

In one of the embodiments of the present disclosure the substituents R¹ and R² in the Formula I are selected from the group consisting of C₁-C₄ alkyl groups. C₁-C₄ alkyl groups of the substituents R¹ and R² in the Formula I include methyl, ethyl, propyl, isopropyl, butyl, secondary butyl, isobutyl and tertiary butyl.

In another embodiment of the present disclosure the substituents R¹ and R² in the Formula I are selected from the group consisting of C₁-C₃ alkyl groups. C₁-C₃ alkyl groups of the substituents R¹ and R² in the Formula I include methyl, ethyl, propyl and isopropyl.

In yet another embodiment of the present disclosure the substituents R¹ and R² in the Formula I are selected from the group consisting of C₁-C₂ alkyl groups. C₁-C₂ alkyl groups of the substituents R¹ and R² in the Formula I include methyl and ethyl.

25 In yet another embodiment of the present disclosure R¹ and R² in the Formula I are ethyl.

The substituents R¹ and R² in the Formula I can be same or different. For instance, R¹ can be methyl and R² can be ethyl.

Examples of the substituents of R^1 and R^2 include but are not limited to halogen such as chlorine, bromine, iodine, OH, -CN, -NO₂, -CHO, -COOH and -COOR¹.

5 The substituents R^3 and R^4 in the Formula I are independently selected from the group comprising hydrogen, optionally substituted C₁-C₅ alkyl groups. C₁-C₅ alkyl groups of the substituents R^3 and R^4 in the Formula I include methyl, ethyl, propyl, isopropyl, butyl, secondary butyl, isobutyl, tertiary butyl, pentyl, tertiary pentyl, neopentyl, isopentyl, secondary pentyl and 3-pentyl.

In one of the embodiments of the present disclosure the substituents R^3 and R^4 in the Formula I are selected from the group consisting of C₁-C₄ alkyl groups. C₁-C₄ alkyl groups of the substituents R^3 and R^4 in the Formula I include methyl, ethyl, propyl, isopropyl, butyl, secondary butyl, isobutyl and tertiary butyl.

10 In another embodiment of the present disclosure the substituents R^3 and R^4 in the Formula I are selected from the group consisting of C₁-C₃ alkyl groups. C₁-C₃ alkyl groups of the substituents R^3 and R^4 in the Formula I include methyl, ethyl, propyl and isopropyl.

In yet another embodiment of the present disclosure the substituents R^3 and R^4 in the Formula I are selected from the group consisting of C₁-C₂ alkyl groups. C₁-C₂ alkyl groups of the substituents R^3 and R^4 in the Formula I include
15 methyl and ethyl.

In yet another embodiment of the present disclosure the substituents R^3 and R^4 in the Formula I are hydrogen.

The substituents R^3 and R^4 in the Formula I can be same or different.

In another embodiment of the present disclosure the substituent R^3 in the Formula I is hydrogen and the substituent R^4 in the Formula I is selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, secondary butyl,
20 isobutyl, tertiary butyl, pentyl, tertiary pentyl, neopentyl, isopentyl, secondary pentyl and 3-pentyl.

In another embodiment of the present disclosure the substituent R^3 in the Formula I is hydrogen and the substituent R^4 in the Formula I is selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, secondary butyl, isobutyl and tertiary butyl.

In another embodiment of the present disclosure the substituent R^3 in the Formula I is hydrogen and the substituent R^4 in the Formula I is selected from the group consisting of methyl, ethyl, propyl and isopropyl.
25

In yet another embodiment R^3 can be hydrogen and R^4 can be methyl.

Examples of the substituents of R^3 and R^4 include but are not limited to halogen such as chlorine, bromine, iodine, OH, -CN, -NO₂, -CHO, -COOH and -COOR¹.

The substituents R^3 and R^4 may form a ring with the carbon atoms to which they are bound. In an exemplary
30 embodiment, R^3 and R^4 together with the atoms to which they are bound form a three to eight membered ring.

In another exemplary embodiment R^3 and R^4 together with the atoms to which they are bound form a three to seven membered ring.

The denotation "n" in the Formula I is an integer from 1 to 3. In one embodiment, the denotation "n" ranges from 1 to 2. Preferably, the denotation "n" is 1. When the denotation "n" in the Formula I is 2 or 3 then R^3 and R^4 may be attached to the same carbon atom or different carbon atoms.

The compound of Formula I is obtained from the compound of Formula IIa or IIb and the compound of Formula III. The substituents R^1 and R^2 of the compound of Formula IIa or IIb have the same meaning as described herein before. The denotation "M" in the Formula IIa or IIb is an inorganic cation, NH_4 or an organic cation.

M in the compound of Formula IIa is selected from the group comprising NH_4 , and elements in group 1 and 2 of the modern periodic table such as Na, K and Mg. M in the compound of Formula IIb is selected from the elements in group 3 to 16 of the modern periodic table such as Cu, Mn, Fe, Co, Pb, Sn, Pt, Pd, Au, Hg, Al and Si.

The substituents R^3 and R^4 of the compound of Formula III have the same meaning as described herein before. The denotation x^1 and x^2 are independently selected from the group comprising -halogen, -mesylate, and -triflate. Halogen is selected from chlorine, bromine or iodine. For the purpose of this invention disclosed in the disclosure, when either of or both of R^3 and R^4 is/are hydrogen then halogen is not bromine.

In one of the embodiments of the present disclosure the compound of Formula I prepared by the process of the present disclosure has the following definition of the substituents: x^1 and x^2 are independently halogen; n is 1 to 2; R^1 and R^2 are independently selected from the group comprising optionally substituted C_1 - C_4 alkyl groups; R^3 and R^4 are independently selected from the group comprising hydrogen and optionally substituted C_1 - C_3 alkyl groups; when n is more than 1, x^1 and x^2 may bound with the same carbon atom or with different carbon atoms, and R^3 and R^4 may bound with the same carbon atom or with different carbon atoms; and M is an inorganic cation or NH_4 .

In one of the embodiments of the present disclosure the compound of Formula I prepared by the process of the present disclosure has the following definition of the substituents: x^1 and x^2 are independently chlorine, iodine or fluorine; n is 1; R^1 and R^2 are C_1 - C_2 alkyl groups; R^3 and R^4 are hydrogen; and M is Na, K or NH_4 .

In one of the preferred embodiments, sodium or potassium or ammonium salt of O, O'-diethyl dithiophosphate is reacted with methylene dichloride or methylene diiodide or methylene difluoride to obtain tetraethyl methylene bis-dithiophosphate.

The present disclosure also relates to the compound of Formula I obtained by the process of the present disclosure.

The present disclosure further relates to the compound of Formula I obtained by the process of the present disclosure in a formulation comprising at least one acceptable excipient.

The present disclosure still further relates to the compound of Formula I obtained by the process of the present disclosure in a combination with at least one other agrochemical.

The present disclosure further relates to the compound of Formula I obtained by the process of the present disclosure in a kit comprising a package containing at least one acceptable excipient and optionally at least one agrochemical.

The present disclosure further relates to the use of the compound of Formula I obtained by the process of the present disclosure as an agrochemical.

- 5 The term "agrochemical" for the purpose of the present disclosure shall include any chemical capable of being used in protecting or promoting the growth or treating or being used as ancillary in protecting or promoting the growth or treating a plant or plant material or the locus thereof.

The present disclosure further relates to a method of protecting plants or plant materials. The method comprises applying an effective amount of compound of Formula I prepared by the process of the present disclosure to the
10 plant or the plant material to be protected.

The term "plant" is understood here to mean all plants and plant populations, such as desired and undesired wild plants or crop plants (including naturally occurring crop plants). Crop plants can be plants which can be obtained by conventional breeding and optimization methods or by biotechnological and genetic engineering methods or combinations of these methods, including the transgenic plants and including the plant cultivars which are
15 protectable and non-protectable by plant breeders' rights.

For the purpose of the present disclosure the term "plant" also includes a living organism of the kind exemplified by trees, shrubs, herbs, grasses, ferns, and mosses, typically growing in a site, absorbing water and required substances through its roots, and synthesizing nutrients in its leaves by photosynthesis.

Examples of "plant" for the purpose of the present disclosure include but are not limited to agricultural crops such as
20 cereals, corn, rice, soybean and other leguminous plants, fruits and fruit trees, nuts and nut trees, citrus and citrus trees, any horticultural plants, cucurbitaceae, oleaginous plants, tobacco, coffee, tea, cacao, sugar beet, sugar cane, cotton, potato, tomato, onions, peppers and vegetables, ornamentals, any floricultural plants and other plants for use of human and animals.

The plant material for the purpose of the present disclosure includes but is not limited to cuttings, leaves, twigs,
25 tubers, flowers, seeds, branches, roots including taproot, lateral roots, root hairs, root apex, root cap, rhizomes, slips, shoots, fruits, fruit bodies, bark, stem, buds, auxillary buds, meristem, nodes, internodes, and locus thereof.

In one embodiment the process for preparing the compound of Formula I is biphasic.

The process of the present disclosure of reacting the compound of Formula IIa or IIb and the compound of Formula III the reaction is carried out in the absence of solvent/co-solvent.

- 30 In one of the embodiments of the present disclosure the process of reacting the compound of Formula IIa or IIb and the compound of Formula III is carried out in the absence of a reagent.

In one of the embodiments of the present disclosure the process of reacting the compound of Formula IIa or IIb and the compound of Formula III is carried out in the presence of a reagent.

The present disclosure is further described in the light of the following non-limiting examples which are set forth for illustration purpose only and not to be construed for limiting the scope of the disclosure.

EXAMPLES

Example 1:

General Process:

The compound of Formula IIa or IIb and the alkylene inserting agent of Formula III were charged in an autoclave at 25 °C to obtain a mixture. The autoclave was closed and inert gas was purged into the autoclave till a pressure of 1 to 2 kg/cm² was attained in the autoclave. The mixture in the autoclave was heated to a temperature of 50 to 120 °C during which the pressure increased to 3 to 15 kg/cm². The reaction was held at 50 to 120 °C for 6 to 15 hours. After completion of the reaction, heating was stopped, autoclave and the mixture were allowed to cool to room temperature. A product of Formula I along with byproducts and unreacted reactants was washed with aqueous solution of sodium carbonate to obtain organic layer and aqueous layer. The organic layer was separated and distilled to obtain the pure product of Formula I.

The following table 1 depicts examples for the preparation of the compound of Formula I wherein, R¹ and R² is ethyl, M is sodium, n is 1, x¹ and x² are chlorine, R³ and R⁴ are hydrogen i.e, Ethion

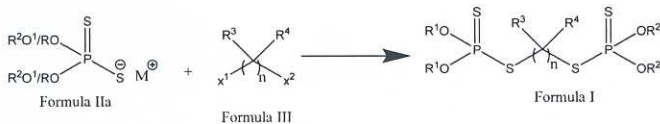


Table 1:

Sr. No	Formula IIa	Formula III (MDC)	Initial N ₂ pressure (kg/cm ²)	Catalyst	Reaction pressure (kg/cm ²)	Temp. °C	Reaction time (hrs)	G.C %		
	Ratio of Formula IIa: Formula III (MDC)							Ethion (Formula I)	Formula V	Formula IV
1	1	0.5	2.0	-	8.5	85-90	10	81.40%	13.80%	3.94%
2	1	0.5	1.0	-	7.0	85-90	10	81.00%	7.50%	2.50%
3	1	1	1.0	-	5.0	85-90	10	78.10%	4.55%	15.83%
4	1	0.5	1.0	-	2.5	50	10	71.90%	7.60%	6.54%

5	1	0.5	1.0	-	3.0	60	15	71.96%	7.65%	6.54%
6	1	0.7	1.0	-	5.0	85-90	10	54.73%	37.08%	0.40%
7	1	0.5	0.0	-	5.0	85-90	10	54.73%	37.06%	0.40%
8	1	0.5	1.0	-	15.0	120	10	53.43%	35.89%	1.00%
9	1	4	1.0	-	8.0	85-90	10	52.66%	12.77%	0.88%
10	1	2	1.0	-	6.0	85-90	10	52.52%	23.30%	13.10%
11	1	0.5	2.0	-	3.0	50	10	45.00%	34.24%	2.95%
12	1	10	1.0	-	10.0	85-90	10	26.97%	6.69%	57.77%
13	1	4	1.0	-	2.5	60	10	24.33%	3.15%	67.30%
14	1	0.5	1.0	-	1.0	25-30	24	8.48%	14.77%	44.12%
15	1	11	1.0	-	2.0	40	10	4.21%	27.52%	52.19%
16	1	0.5	1.0	Dimethyl formamide (DMF)	7.0	85-90	10	37.00%	53.14%	2.57%
17	1	0.5	1.0	Triethyl amine (TEA)	7.0	85-90	10	1.76%	85.82%	7.68%
18	1	0.5	1.0	Sodium bromide (NaBr)	7.0	85-90	10	39.66%	41.96%	1.90%

Conclusion:

From the above table, it can be concluded that

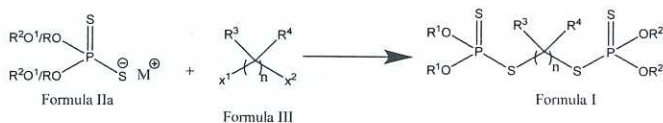
- the process of the present invention is suitable with various inorganic salts of the reactant,
- 5 - the process of the present invention shows good selectivity in presence of basic, acidic and phase transfer catalyst,
- inert atmosphere is must for reaction completion and to minimize the impurity formation. In other words, inert atmosphere induces high product selectivity,
- though reaction is workable at 50 to 120 °C, the optimal results are obtained at 80 to 90 °C, and
- 10 - the process of the present disclosure is effective at 2.5 to 15 kg/cm² pressure.

Example 2:

Various compounds of Formula I were prepared by the following process:

The compound of Formula IIa and the alkylene inserting agent of Formula III were charged in an autoclave at 25 °C to obtain a mixture. The autoclave was closed and nitrogen gas was purged into the autoclave till a pressure of 1 to 2

kg/cm² was attained in the autoclave. The mixture in the autoclave was heated to a temperature of 85-95 °C during which the pressure increased to 3 to 15 kg/cm². The reaction was held at 85-95 °C for 10 hours. After completion of the reaction, heating was stopped, autoclave and the mixture were allowed to cool to room temperature. A product of Formula I along with byproducts and unreacted reactants was washed with aqueous solution of sodium carbonate to obtain organic layer and aqueous layer. The organic layer was separated and distilled to obtain the pure product of Formula I.



The embodiments herein and the various features and advantageous details thereof are explained with reference to the non-limiting embodiments in the description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

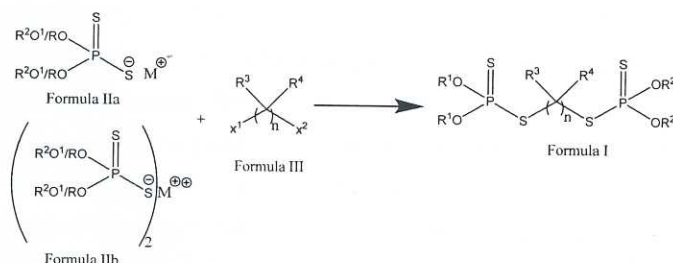
The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the embodiments as described herein.

Any discussion of documents, acts, materials, devices, articles and the like that has been included in this specification is solely for the purpose of providing a context for the disclosure. It is not to be taken as an admission that any or all of these matters form a part of the prior art base or were common general knowledge in the field relevant to the disclosure as it existed anywhere before the priority date of this application.

The numerical values mentioned in the description and the foregoing claims though might form a critical part of the invention of the present disclosure, any deviation from such numerical values shall still fall within the scope of the present disclosure if that deviation follows the same scientific principle as that of the invention disclosed in the present disclosure.

We Claim:

1. A process for preparing a compound of Formula I; said process comprising a step of reacting a compound of Formula IIa or Formula IIb and an alkylene inserting agent of Formula III at a temperature ranging from 50 to 120 °C, a pressure ranging from 2.5 to 15 kg/cm² and under inert atmosphere,



wherein,

x¹ and x² are independently selected from the group comprising -halogen, -mesylate, and -triflate, n is 1 to 3;

R¹ and R² are independently selected from the group comprising optionally substituted C₁-C₅ alkyl groups;

R³ and R⁴ are independently selected from the group comprising hydrogen, optionally substituted C₁-C₅ alkyl groups, or R³ and R⁴ may form a ring with the carbon atoms to which they are bound; when n is more than 1, x¹ and x² may bound with the same carbon atom or with different carbon atoms, and R³ and R⁴ may bound with the same carbon atom or with different carbon atoms; and

M is an inorganic cation, NH₄ or an organic cation.

2. The process as claimed in claim 1, wherein the reaction is carried out in the presence of at least one catalyst.
3. The process as claimed in claim 2, wherein the catalyst is at least one selected from the group comprising of para-toluene sulfonic acid, tertiary butyl ammonium bromide, dimethyl formamide, sodium bromide, Iodine and sodium iodide.
4. The process as claimed in claim 1, wherein the ratio of the compound of Formula IIa or IIb to the alkylene inserting agent of Formula III ranges from 1:0.5 to 1:10.
5. The process as claimed in claim 1, wherein the temperature ranges from 70 to 95 °C and the pressure ranges from 5 to 10 kg/cm².
6. The process as claimed in claim 1, wherein the inert atmosphere is maintained by using at least one inert gas selected from the group consisting of nitrogen and argon
7. The process as claimed in claim 1, wherein the reaction is carried out for a time period ranging from 6 to 15 hours.
8. The process as claimed in claim 1, wherein
x¹ and x² are independently halogen;

n is 1 to 2;

R¹ and R² are independently selected from the group comprising optionally substituted C₁-C₄ alkyl groups;

R³ and R⁴ are independently selected from the group comprising hydrogen and optionally substituted C₁-C₃ alkyl groups;

when n is more than 1, x¹ and x² may bound with the same carbon atom or with different carbon atoms, and R³ and R⁴ may bound with the same carbon atom or with different carbon atoms; and

M is an inorganic cation or NH₄.

9. The process as claimed in claims 1 and 8, wherein the halogen is chlorine, bromine, iodine, provided that when R³ and/or R⁴ are/is hydrogen, halogen is not bromine.

10. The process as claimed in claims 1 and 8, wherein M in the compound of Formula IIa is selected from the group comprising -NH₄, and the elements in groups 1 and 2 of the modern periodic table; M in the compound of Formula IIb is selected from the elements in group 3 to 16 of the modern periodic table.

11. The process as claimed in claim 1, wherein

x¹ and x² is independently chlorine, iodine or fluorine,

n is 1,

R¹ and R² are C₁-C₂ alkyl groups,

R³ and R⁴ are hydrogen, and

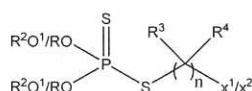
M is Na, K or NH₄.

12. The process as claimed in claim 1, wherein the compound of Formula I is tetraethyl methylene bis-dithiophosphate, the compound of Formula IIa is selected from sodium or potassium or NH₄ salt of O, O'-diethyl dithiophosphate and the compound of Formula III is selected from the group of methylene dichloride, methylene diiodide and methylene difluoride.

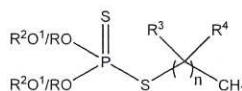
13. The process as claimed in claim 1, comprises pre-steps of charging the compound of Formula IIa or IIb and the alkylene inserting agent of Formula III at a temperature ranging from 10 to 50 °C in a container and closing the container, passing an inert gas to obtain a pressure in the range of 0.5 to 3.0 kg/cm² and heating a mixture in the container.

14. The process as claimed in claim 1, further comprises steps of cooling the reaction mixture, washing the reaction with aqueous containing at least one base, separating an organic layer comprising the compound of Formula I, and distilling the organic layer to obtain compound of Formula I.

15. The compound of Formula I obtained by the process as claimed in claims 1, 8, 11 and 12, said compound of Formula I comprises about 0.3% of the compound of Formula IV and about 0.5% of the compound of Formula V,



Formula IV



Formula V

16. The compound of Formula I obtained by the process as claimed in claims 1, 8, 11 and 12.
17. The compound of Formula I obtained by the process as claimed in claims 1, 8, 11 and 12 in a formulation comprising at least one excipient.
18. The compound of Formula I obtained by the process as claimed in claims 1, 8, 11 and 12 in a combination with at least one other agrochemical.
19. The compound of Formula I obtained by the process as claimed in claims 1, 8, 11 and 12 in a kit comprising a package containing at least one acceptable excipient and optionally at least one agrochemical.
20. Use of the compound of Formula I obtained by the process as claimed in claims 1, 8, 11 and 12 as an agrochemical.
21. A method of protecting plants, plant materials or locus thereof, said method comprising applying an effective amount of compound of Formula I as claimed in claims 1, 8, 11 and 12 to the plants, plant materials or locus thereof to be protected.

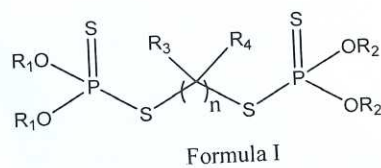
Dated this 29th day of March, 2017.


PRABHAKAR MANI PRATAP
of VUTTS & ASSOCIATES LLP
AGENT FOR THE APPLICANTS
IN/PA No. 1217

ABSTRACT

A process for preparing alkylene bis-dithiophosphates

The present disclosure relates to a process for preparing alkylene bis-dithiophosphates, particularly a compound of Formula I,



wherein, the substituents have the same meaning as described in the description and the claims.



**GOBIERNO DE INDIA
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INDUSTRIA
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A TODOS A QUIENES CORRESPONDA

Yo, el abajo firmante, funcionario debidamente autorizado para firmar y expedir el certificado en nombre del Auditor General de Patentes, Diseños y Marcas registradas de conformidad con las disposiciones del Artículo 73(3) de la Ley de Patentes de 1970 de India, por el presente documento certifico que el documento adjunto al mismo es una copia auténtica del documento o documentos según presentado(s) en relación con la siguiente Solicitud de patente:

Número de solicitud **201711011197**

Fecha de presentación: **29 de marzo de 2017**

Nombre del documento o documentos solicitado(s)

Formulario de solicitud 1

Memoria descriptiva provisional presentada el 29 de marzo de 2017 (con arreglo a un registro de presentación electrónica)

El presente certificado se expide en virtud de las facultades que me son conferidas por el Artículo 147(1) de la Ley de Patentes de 1970 de India.

Fechado este día **23 de marzo de 2018**.

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23/03/18

(Bimi G.B.)

Auditor de Patentes y Diseños

(Signatario autorizado)

FORMULARIO 1 LEY DE PATENTES DE 1970 DE INDIA (39 of 1970) Y REGLAMENTO SOBRE PATENTES DE 2003 SOLICITUD DE CONCESIÓN DE PATENTE [Ver Art. 7, 54 y 135, y subapartado (1) de la Regla 20]		(PARA USO EXCLUSIVO DE LA OFICINA) N.º de solicitud: Fecha de presentación: Cantidad de tasa pagada: N.º de identificación CBR (registro mercantil central): Firma:	
1. SOLICITANTE			
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2. INVENTOR			
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3. TÍTULO DE LA INVENCIÓN: PROCESO PARA LA PREPARACIÓN DE ALQUILEN BIS-DITIOFOSFATOS			
4. DIRECCIÓN DE CORRESPONDENCIA DEL SOLICITANTE / REPRESENTANTE DE PATENTES AUTORIZADO EN INDIA			
VUTTS & ASSOCIATES LLP, Advocates, N.º 704, The Castle, Plot 36-A, Sector 56, Gurgaon – 122009 Haryana, INDIA. Tel: +91-(0)11-41096440 y 41096441, N.º de fax: +91-(0)1141096442, N.º de móvil: 93128-98660, correo electrónico: email@vutts.com		N.º de teléfono: 01141096441 N.º de fax: 01141096442 N.º de móvil: Correo electrónico: email@vutts.com	

5. INFORMACIÓN DE PRIORIDAD DE LA(S) SOLICITUD(ES) PRESENTADA(S) EN EL PAÍS MIEMBRO DEL CONVENIO					
Solicitud	País	Número de solicitud	Fecha de presentación	Nombre del solicitante	Título de la invención
6. INFORMACIÓN PARA PRESENTAR UNA SOLICITUD EN FASE NACIONAL EN VIRTUD DEL TRATADO DE COOPERACIÓN EN MATERIA DE PATENTES (PCT)					
Número de solicitud internacional			Fecha de presentación internacional asignada por la Oficina Receptora		
PCT//					
7. INFORMACIÓN PARA PRESENTAR SOLICITUD DE DIVISIONAL					
N.º de solicitud original (primera solicitud)			Fecha de presentación de la solicitud original (primera solicitud)		
8. INFORMACIÓN PARA PRESENTAR SOLICITUD DE ADICIONAL					
N.º de patente/solicitud principal			Fecha de presentación de la solicitud principal		
9. DECLARACIONES					
Declaración de los inventores: Nosotros, ANUJ KUMAR MITTAL, NITIN JAIKANT MALVIYA, DEVENDRA SINGH DALAWAT, MURLI DHAR SONI, ADI NARAYANA SANNIBONIA y KRISHNA KANT DASHORA, somos los inventores primeros y auténticos de la invención y declaramos que el solicitante es nuestro cesionario o representante legal. Fecha: Firmas de los inventores: Nombres: ANUJ KUMAR MITTAL, NITIN JAIKANT MALVIYA, DEVENDRA SINGH DALAWAT, MURLI DHAR SONI, ADI NARAYANA SANNIBONIA , KRISHNA KANT DASHORA Declaración del solicitante en el país miembro del convenio Yo, solicitante en el país miembro del convenio declaro que el solicitante del presente es mi cesionario o representante legal. Fecha: Firma: Nombre del signatario: PI Industries Ltd.					
Declaración del solicitante: • La memoria descriptiva provisional relativa a la invención se presenta junto con esta solicitud • La invención anteriormente menciona obra en mi poder • No existen motivos legítimos para objetar la concesión de patente • Soy el cesionario o representante legal de los inventores primeros y auténticos					
10. DOCUMENTOS ADJUNTOS A LA SOLICITUD:					
Documento	Descripción del documento		Nombre del archivo		
1	MEMORIA DESCRIPTIVA PRVISIONAL		Form 2 with Provisional Specification.pdf		

Por el presente documento declaro que, a mi leal saber y entender, los hechos y asuntos indicados en el presente son auténticos y solicito la concesión de una patente para dicha invención.

Fechado a (fecha de pago final): -----

Firma:

Nombre: PRABHAKAR MANI PRATAP

Al Auditor de Patentes

Oficina de Patentes de NEW DELHI

El presente formulario ha sido firmado electrónicamente.

FORMULARIO 2 LEY DE PATENTES DE 1970 DE INDIA (39 of 1970) Y Reglamento sobre patentes de 2003 de India MEMORIA DESCRIPTIVA PROVISIONAL (Ver artículo 10 y regla 13)
1. TÍTULO DE LA INVENCIÓN Adhesivos opacos en condición húmeda para aplicación de etiquetas
2. SOLICITANTES (a) PI INDUSTRIES LTD. (b) Una sociedad de India (c) De Udaisagar Road, Udaipur- 313001, Rajasthen, INDIA
3. INTRODUCCIÓN A LA DESCRIPCIÓN La siguiente memoria descriptiva describe la invención.

POWER OF ATTORNEY	PODER
The corporation PI INDUSTRIES LTD at present carrying out its purpose, acting through its legal representative, formed and existing according to the laws of India, with registered offices at Udaisagar Road, Udaipur- 313001, Rajasthan (India) hereby appoints Ernesto Cavelier, with TPA 11.519, and/or Helena Camargo Williamson, with TPA 76985 and/or Jaime Herrera Rodriguez, with TPA No. 71.661, and/or Daniel Posse Velasquez, with TPA No. 42.529, and/or Marianne Posse Velasquez, with TPA No. 35.752 and/or Juan Guillermo Ruiz Hurtado, with TPA No. 40.066, and/or Francisco Urrutia Montoya, with TPA No. 27.321, and/or José Alejandro Torres Hernández, with TPA No. 75.372 and/or Alvaro José Rodriguez with TPA No. 79.711 (the "<u>Attorneys</u>"), domiciled at Cra. 7 No. 71-52 Torre A Of. 504 of Bogota D.C., Colombia, to jointly or separately, represent it before any person, administrative or judicial entities, arbitrator, mediator, court or board of arbitration or conciliation, or before any authority for the purpose of obtaining and maintaining the protection of its industrial property rights and acting in the defense of such rights, being empowered for such purpose to: 1. Apply for, follow the respective proceedings and obtain or register patents of invention, utility models, industrial designs, plant varieties, trademarks, slogans, names and signs and denominations of origin, and their renewal and extension, assignment thereof, registration of change of name and domicile, and of agreements and licenses thereon, and for registration of transfer of technology contracts; 2. Apply for protection of its copyrights, follow the respective proceedings, obtain, and register them, as well as protect its industrial secrets and know-how; 3. Apply for, follow the respective proceedings, and obtain health agricultural and veterinary registrations and permits for its products, and operating licenses, as well as renewals or extensions thereof, assignment of the same, registration of	La sociedad PI INDUSTRIES LTD actualmente en ejercicio de su objeto social, actuando por medio de su Representante Legal, organizada y existente de acuerdo con las leyes de India, con domicilio en Udaisagar Road, Udaipur- 313001, Rajasthan (India) por el presente otorga poder especial a Ernesto Cavelier, con TPA 11.519, y/o Helena Camargo Williamson, con TPA 76985 y/o Jaime Herrera Rodríguez, con TPA No. 71.661, y/o Daniel Posse Velásquez, con TPA No. 42.529, y/o Marianne Posse Velásquez, con TPA No. 35.752 y/o Juan Guillermo Ruiz Hurtado, con TPA No. 40.066, y/o Francisco Urrutia Montoya, con TPA No. 27.321, y/o José Alejandro Torres Hernández, con TPA No. 75.372 y/o Álvaro José Rodríguez con TPA No. 79.711 (los "Apoderados") con domicilio en la Cra. 7 No. 71-52 Torre A Of. 504 de Bogotá D.C., Colombia, para que, conjunta o separadamente, la representen ante cualquier entidad, autoridad o persona, especialmente ante las del orden administrativo, contencioso administrativo o judicial, y ante conciliadores, árbitros o tribunales de arbitramento, para obtener y mantener la protección de sus derechos de propiedad industrial y para actuar en defensa de tales derechos, facultándolos para: 1. Solicitar, tramitar y obtener o registrar patentes de invención, modelos de utilidad, diseños industriales, variedades vegetales, marcas, lemas, nombres y enseññas comerciales y denominaciones de origen, así como sus renovaciones y prórrogas, la cesión de los mismos, la anotación de cambios de nombre y domicilio, y el registro de acuerdos y licencias en relación con ellos y para solicitar el registro de contratos de transferencia de tecnología; 2. Solicitar, tramitar, obtener y registrar sus derechos de autor así como la protección de sus secretos industriales y know-how; 3. Solicitar, tramitar y obtener registros sanitarios, agrícolas y veterinarios para sus productos y permisos y licencias de funcionamiento, así como sus renovaciones o prórrogas, la cesión de los mismos, la anotación de cambios de nombre y domicilio, y el

change of name or domicile, and registration of agreements and licenses in relation thereof; 4. File oppositions, observations, claims, reconsideration petitions, appeals, administrative or judicial cancellation actions, nullity actions, consumer protection actions, protection of industrial secrets and other actions related to rights derived from the above mentioned matters and against unfair competition and restraint of trade, actions related to obtaining or exploiting licenses, as well as intervention in civil, commercial, criminal, administrative contentious and police proceedings, all in relation to actions or proceedings initiated by the grantor or by third parties against or in relation to the grantor; 5. Conciliate, cancel, settle, compromise, desist, receive and take possession of the subject matter of litigation and renounce or desist rights granted or in the process of being granted, and admit the facts in legal proceedings; 6. Ratify or not the acts undertaken by a self-appointed agent; 7. Receive electronic service of process during the application and after any of the mentioned rights have been granted as well as to appoint attorneys, resign and substitute the present power of attorney and revoke the substitutions. 8. Grant powers of attorney to law firms abroad who represent the company in order to carry out all intellectual property proceedings required in each of the countries where the company may have an interest. The Attorneys are empowered to carry out all the acts required to finalize the tasks entrusted to them, as well as to receive, desist, substitute and reassume this power of attorney, settle, resign, and in general, for any other act in defense of the rights of the grantor.	registro de acuerdos y licencias en relación con ellos; 4. Ejercer acciones de oposición, observación, reclamo, reconsideración, reposición, apelación, cancelación administrativa o judicial, nulidad, protección al consumidor, concesión de licencias, protección de secretos industriales y demás acciones y recursos relacionados con derechos derivados de los asuntos arriba indicados y en contra de la competencia desleal y de las restricciones al comercio, acciones derivadas de la obtención o explotación de licencias, así como intervenir en juicios civiles, comerciales, penales, contencioso-administrativos y de policía, todo lo cual podrá darse en acciones o juicios promovidos por la otorgante o en su contra; 5. Conciliar, cancelar, transigir, comprometer, desistir, recibir y tomar posesión de la cosa objeto de litigio y renunciar o desistir a derechos concedidos o en curso de concesión, y admitir los hechos del proceso; 6. Ratificar o no la agencia oficiosa; 7. Recibir notificaciones electrónicas durante el trámite y después de la concesión de cualquiera de los derechos mencionados así como designar apoderados judiciales o extrajudiciales, renunciar y sustituir el presente poder y revocar las sustituciones que hicieren. 8. Otorgar poderes en nombre de la sociedad que representa a las firmas de abogados en el extranjero, para realizar los diferentes trámites de propiedad intelectual que se requieran en cada uno de los países en donde la sociedad tenga interés Los Apoderados quedan facultados para llevar a cabo todas las actuaciones que sean necesarias para llevar a buen término la tarea que les ha sido encomendada, así como para recibir, desistir, sustituir y reasumir este poder, transar, renunciar y en general, para cualquier otra actuación que tienda a defender los derechos de la compañía que represento.
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The grantor shall pay each and every one of the attorneys for the costs, claims, expenses and liabilities of any nature, incurred by each one of the attorneys in relation with this power of attorney and shall ratify and confirm all acts undertaken by the attorneys in relation with this power of attorney, except in the cases of default, negligence or acts carried out in contradiction to the express instructions of the grantor.

This power of attorney shall be ruled and interpreted by the laws of the Republic of Colombia, which govern it in its entirety.

Given and signed at Madrid today, the 30th of May of 2018.

El otorgante pagará a cada uno de los apoderados por los costos, reclamaciones, gastos y obligaciones de cualquier naturaleza, en que incurra cada uno de ellos en relación con este poder y ratificará y confirmará los actos realizados por ellos en relación con este poder, excepto en los casos de incumplimiento, negligencia, o de actos llevados a cabo en contradicción con las expresas instrucciones del otorgante.

Este poder se registrará e interpretará de acuerdo con las leyes de la República de Colombia, la cual lo regula en su integridad.

Dado y firmado en Madrid hoy, 30 de mayo de 2018.

Signature/Firma

Nombre:

Cargo:

Juan Pedro VALLEJO LÓPEZ
Representante legal