

07-SS683

CAVELIER

ABOGADOS

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Señora Jefe de la
DIVISION DE NUEVAS CREACIONES
Superintendencia de Industria y Come:
E. S. D.

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



No. 07-055683- -00002-0000

Fecha: 2007-09-05 16:39:36 Dep. 2020 NUECREACION
Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 444 RESPUESTAREQUE Folios: 11

Trámite : 011

Evento : 379

Actuación : 444

Referencia : Expediente No. 07.055.683
Asunto : REDUCCIÓN DE EMISIONES DE NOX EN
PROCESOS FCC DE QUEMADO TOTAL
Solicitante : W.R. GRACE & CO.-CONN.
Clase : C10G 011/004

Fecha de solicitud: Junio 1, 2007

1. Yo, Emilio FERRERO, obrando como apoderado del solicitante en el asunto antes identificado, doy respuesta al oficio No. 07969, notificado por fijación en lista de fecha 6 de julio de 2005.

2. Mediante el oficio No. 07969 se puso en conocimiento del solicitante el resultado del examen de forma realizado por ese Despacho, requiriéndole para completar el siguiente requisito:

2.1 Cesión de Inventor: Presento junto con este escrito el documento en que consta la cesión del derecho a la patente otorgado por los inventores al solicitante, debidamente legalizado, junto con su respectiva traducción oficial.

2.2. Solicitud de Examen Preliminar Internacional: Presento junto con este escrito el documento en que consta la solicitud de

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Examen Preliminar Internacional. A pesar de que el Reporte de Examen Preliminar de Patentabilidad no ha sido expedido aun el mismo no tendrá anexos debido a que no hubo modificaciones a la solicitud original en la fase internacional, como lo muestra este documento.

3. Puesto que se han atendido a cabalidad las observaciones hechas por ese Despacho sobre la presente solicitud de patente, atentamente solicito que se continúe con su tramitación.

Señora Jefe,



EMILIO FERRERO

T.P.A. No. 31.929

COLO 06032 841 010 9

2 AHP\AHP\ID-107144\WPCL6032

No. M-2007-107144\AHP

2252 92

374

CAVELIER

ABOGADOS

EDIFICIO SISKI
CARRERA 4a N° 72-35
BOGOTA, 8 - COLOMBIA

CESION

Yo, (nosotros) abajo firmado (s)

1. YALURIS, George

2. RUDESILL, John

3.

4.

domiciliado(s) en

1. 6702 Surrey Lane
Columbia, Maryland 21029
Estados Unidos de América

2. 10824 Hilltop Lane
Columbia, Maryland 21044

declaro(amos) bajo juramento ser único(s) y verdadero(s) inventor(es)
de la invención:

declaro(amos) así mismo que cedo(emos) y transfiero(erimos), sin
limitación, a favor de la sociedad

constituida y existente de conformidad con las leyes de

domiciliada en

7500 Grace Drive, Columbia
Maryland 21044-4098
Estados Unidos de América

todos los derechos inherentes a dicha invención y que la citada
Compañía queda facultada para solicitar en su nombre la patente de
invención correspondiente en la República de Colombia.

ASSIGNMENT

I (we), the undersigned

1. YALURIS, George

2. RUDESILL, John

3.

4.

of

1. 6702 Surrey Lane
Columbia, Maryland 21029
United States of America

2. 10824 Hilltop Lane
Columbia, Maryland 21044

state(s) under oath to be sole and true inventor(s) of the invention:

REDUCTION OF NOx EMISSIONS IN FULL
BURN FCC PROCESSES

state as well, that assign, without reservations or limitations in favour
of

W.R. GRACE & CO.-CONN

a corporation constituted and existing in conformity with the laws of

domiciled in

7500 Grace Drive, Columbia
Maryland 21044-4098
United States of America

all rights inherent to said invention and that the above mentioned
company hereby is enabled to apply, in its name, for the corresponding
patent invention, in the Republic of Colombia

Dado y firmado hoy/Given and signed this
en/in

por/by

Firma/Signature

George Yaluris

Firma/Signature

John Rudesill

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CERTIFICACIÓN NOTARIAL (INDIVIDUO)

A los _____ días del mes de _____
de 200 ____ Ante mí, Notario Público de

compareció(eron) personalmente _____

a quien(es) doy fe de conocer y me consta que es(son) la(s)
persona(s) firmante(s) del documento que precede, y quien(es)
tiene(n) capacidad legal para otorgarlo

NOTARIO PÚBLICO-NOTARY PUBLIC

NOTARIAL CERTIFICATION (INDIVIDUAL)

On this 7 day of May
200 7 before me, a Notary Public of

Harford County, Maryland
personally appeared George Valoris and
John Rudesill

to me known, and known to me to be the person(s) who executed
that foregoing document, and who has(have) legal capacity to
execute it.

ANGELA M. PORROVICCHIO
NOTARY PUBLIC STATE OF MARYLAND
My Commission Expires August 29, 2009

Angela M. Porrovecchio

APOSTILLE

(Convention de La Haye du 5 octobre 1961)

1. Country:
This public document
2. has been signed by
3. acting in the capacity of
4. bears the seal/stamp of

Certified

5. at 6. the
7. by
8. No.
9. Seal/stamp 10. Signature

94

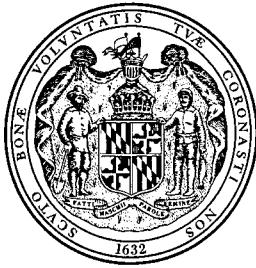
STATE OF MARYLAND, COUNTY OF HARFORD, SCT.:

I, James Reilly, Clerk of the Circuit Court for Harford County, Maryland, a court of record,
do hereby certify that, Angela M. Porrovcchio was a commissioned/appointed and
(name)
qualified a Notary Public commencing on the 12th day of September 2005.

In Testimony Whereof, I have hereunto set my hand
and affixed the seal of the Court this 30th day of

May 2007.

James Reilly OK
Clerk of the Circuit Court for Harford County



The State of Maryland

Office of the Secretary of State

Apostille

(Convention de La Haye du 5 Octobre 1961)

1. Country: United States of America
This public document
2. has been signed by **James Reilly**
3. acting in the capacity of **Clerk of the Circuit Court for Harford County**
4. bears the seal/stamp of the **Circuit Court for Harford County**

Certified

5. at Annapolis, Maryland
6. the **4th day of June, 2007**
7. by The Secretary of State of Maryland
8. Seal



9. Signature

Dennis C. Rhuffe

Interim Secretary of State

No. 198700

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TRADUCCIÓN OFICIAL No. 07.10/07b realizada por Diego Vargas, Traductor Oficial, Resolución No. 0001 de 1999 del Ministerio de Justicia y registrado ante el Ministerio de Relaciones Exteriores de Colombia.

A continuación se traducen los sellos y legalizaciones de un documento mediante el cual 1. YULARIS, George; 2. RUDESILL, John, domiciliados en 1. 6702 Surrey Lane. Columbia, Maryland 21029, Estados Unidos de América y 2. 10824 Hilltop Lane, Columbia, Maryland 21044, respectivamente, declaran ser únicos y verdaderos inventores de la invención "REDUCCIÓN DE EMISIONES NOx EN PROCESOS FCC DE QUEMADO TOTAL" y declaran así mismo que ceden y transfieren sin limitación a **W.R. GRACE & CO.-CONN.**, una sociedad constituida y existente de conformidad con las leyes de Connecticut y domiciliada en 7500 Grace Drive, Columbia, Maryland 21044-4098, Estados Unidos de América, todos los derechos inherentes a dicha invención y que la citada compañía queda facultada para solicitar a su nombre la patente correspondiente en la República de Colombia.

Firma Ilegible
George Yaluris

Firma Ilegible
John Rudesill

CERTIFICACIÓN NOTARIAL (INDIVIDUO) del 7 de mayo de 2007 por medio de la cual se certifican las firmas de George Yaluris y John Rudesill en el anterior documento y su capacidad legal para otorgarlo.

NOTARIO PÚBLICO *Firma Ilegible*

ANGELA M. PORROVICCHIO
NOTARIO PÚBLICO, ESTADO DE MARYLAND
Mí Comisión Vence Agosto 29 de 2009

ESTADO DE MARYLAND, CONDADO DE HARFORD, SCT:

Yo, James Reilly, Secretario del Tribunal de Circuito para el Condado de Harford, Maryland, un tribunal de registro, por el presente certifico que ANGELA M. PORROVICCHIO fue comisionado/nombrado y calificado como Notario Público a partir del 12 de SEPTIEMBRE de 2005.

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En Testimonio de lo Cual, he firmado y fijado el sello del Tribunal al presente hoy 30 de Mayo de 2007.

Firma Ilegible
Secretario del Tribunal de Circuito para el Condado de Harford

SELLO FACSIMILAR

El Estado de Maryland
Oficina del Secretario de Estado

Apostilla

(Convention de La Haye du 5 Octobre 1961)

1. País: Estados Unidos de América
Este documento público.
2. ha sido firmado por **James Reilly**
3. actuando en calidad de **Secretario del Tribunal de Circuito para el Condado de Harford**
4. lleva el sello/estampilla del **Tribunal de Circuito para el Condado de Harford**

Certificado:

5. en Annapolis, Maryland
6. el **4 de junio de 2007**
7. por el Secretario de Estado de Maryland
8. Sello:



10. Firma:
Firma ilegible
Secretario de Estado

No. 198700

Es traducción fiel y completa de la cual se deja copia en esta oficina para su confrontación.

DVZ/ID-8980/WPCL002G/COLO 06032-841-010-9

Dies-F. Vegas
TRADUCTOR E INTERPRETE
ESPAÑOL-INGLES INGLES-ESPAÑOL
RES. 0001 DE ENERO 4 DE 1999
MINISTERIO DE JUSTICIA

7

COMO NOTARIO SEXTO DEL CIRCULO DE SANTAFE DE
BOGOTA, HAGO CONSTAR QUE LA(S) FIRMA(S) DE

Ricardo Felipe Vargas
Zamora

COINCIDE(N) CON LA FIRMA REGISTRADA POR
EL(ELLOS) EN ESTA NOTARIA
SANTAFE DE BOGOTA. 11 JUL 2007

628214
Ricardo Vargas
GOVERNADOR DE LA
AS FUNDACIONES INDICADAS



2007 JUL 11 P 2:05
mas
JEFE DE LEGALIZACIONES
BOGOTA D.C.

+

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ US

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only		
Identification of IPEA		Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference W9558-01
International application No. PCT/US2005/039093	International filing date (day/month/year) 31 October 2005 (31.10.2005)	(Earliest) Priority date (day/month/year) 02 November 2004 (02.11.04)
Title of invention REDUCTION OF NOx EMISSIONS IN FULL BURN FCC PROCESSES		
Box No. II APPLICANT(S)		
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name country.) W.R. GRACE & CO. - CONN. 7500 Grace Drive Columbia, Maryland 21044 United States of America		Telephone No. 410-531-4769
		Facsimile No. 410-531-4195
		Teleprinter No.
		Applicant's registration No. with the Office
State (that is, country) of nationality: US		State (that is, country) of residence: US
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country) YALURIS, George 6702 Surrey Lane Clarksville, Maryland 21029 United States of America		
State (that is, country) of nationality: US		State (that is, country) of residence: US
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country) RUDESILL, John 10824 Hilltop Lane Columbia, Maryland 21044 United States of America		
State (that is, country) of nationality: US		State (that is, country) of residence: US
☐ Further applicants are indicated on a continuation sheet.		

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Sheet No. 2

International application No.
PCT/US2005/039093

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The following person is ☒ agent ☐ common representative
and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s)/ common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/ common representative appointed earlier.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country) ARTALE, Beverly J. 7500 Grace Drive Columbia, Maryland 21044 United States of America	Telephone No. 410-531-4769
	Facsimile No. 410-531-4195
	Teleprinter No.
	Agent's registration No. with the Office 32,366

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTER-NATIONAL PRELIMINARY EXAMINATION

Statement concerning amendments:*

1. The applicant wishes the international preliminary examination to start on the basis of:
☒ the international application as originally filed
the description ☒ as originally filed ☐ as amended under Article 34
the claims ☒ as originally filed ☐ as amended under Article 19 (together with any accompanying statement) ☐ as amended under Article 34
the drawings ☒ as originally filed ☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of the applicable time limit under Rule 69.1(d)

4. ☒ The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54 bis. 1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☒ which is the language in which the international application was filed.
☐ which is the language of a translation furnished for the purposes of international search.
☐ which is the language of publication of the international application.
☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT

Sheet No. 3

International application No.
PCT/US2005/039093

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:			For International Preliminary Examining Authority use only	
			received	not received
1. translation of international application	sheets		☐	☐
2. amendments under Article 34	sheets		☐	☐
3. copy (or, where required, translation) of amendments under Article 19	sheets		☐	☐
4. copy (or, where required, translation) of statement under Article 19	sheets		☐	☐
5. letter	1 sheets		☐	☐
6. other (specify)	sheets		☐	☐

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. ☒ fee calculation sheet | 5. ☐ statement explaining lack of signature |
| 2. ☐ original separate power of attorney | 6. ☐ sequence listings in computer readable form |
| 3. ☐ original general power of attorney | 7. ☐ tables in computer readable form related to sequence listings |
| 4. ☐ copy of general power of attorney; reference number, if any: | 8. ☒ other (specify) Return Receipt Postcard |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).


Beverly J. Artale
Reg. No. 32,366
Attorney for the Applicants

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:	
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):	
3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. ☐ The applicant has been informed accordingly.	6. ☐ The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54 bis. 1(a) and item 7 or 8, below, does not apply.
4. ☐ The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.	7. ☐ The date of receipt of the demand is WITHIN the time limit under Rule 54 bis. 1(a) as extended by virtue of Rule 80.5.
5. Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.	8. ☐ Although the date of receipt of the demand is after the expiration of the time limit under Rule 54 bis. 1(a) the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

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CHAPTER II

PCT

FEE CALCULATION SHEET

Annex to the Demand

International application No. PCT/US2005/039093	For International Preliminary Examining Authority use only								
Applicant's or agent's file reference W9558-01	Date stamp of the IPEA								
Applicant W.R. GRACE & CO. - CONN.									
CALCULATION OF PRESCRIBED FEES 1. Preliminary examination fee (Fee Codes 1605 or 1606) \$600 P 2. Handling fee (Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.) (Fee Code 1705 \$155) \$155 H (Entitled to reduction ☐) 3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box \$755.00 TOTAL									
MODE OF PAYMENT <table style="width: 100%;"> <tr> <td>☒ authorization to charge deposit account with the IPEA (see below)</td> <td>☐ cash</td> </tr> <tr> <td>☐ cheque</td> <td>☐ revenue stamps</td> </tr> <tr> <td>☐ postal money order</td> <td>☐ coupons</td> </tr> <tr> <td>☐ bank draft</td> <td>☐ other (specify):</td> </tr> </table>		☒ authorization to charge deposit account with the IPEA (see below)	☐ cash	☐ cheque	☐ revenue stamps	☐ postal money order	☐ coupons	☐ bank draft	☐ other (specify):
☒ authorization to charge deposit account with the IPEA (see below)	☐ cash								
☐ cheque	☐ revenue stamps								
☐ postal money order	☐ coupons								
☐ bank draft	☐ other (specify):								
AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT (This mode of payment may not be available at all IPEAs) <table style="width: 100%;"> <tr> <td style="width: 50%;"> ☒ Authorization to charge the total fees indicated above. ☒ (This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above. </td> <td style="width: 50%;"> IPEA/ <u>USPTO</u> Deposit Account No.: <u>07-1770</u> Date: <u>May 8, 2006</u> Name: <u>Beverly J. Artale</u> Signature: </td> </tr> </table>		☒ Authorization to charge the total fees indicated above. ☒ (This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	IPEA/ <u>USPTO</u> Deposit Account No.: <u>07-1770</u> Date: <u>May 8, 2006</u> Name: <u>Beverly J. Artale</u> Signature:						
☒ Authorization to charge the total fees indicated above. ☒ (This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.	IPEA/ <u>USPTO</u> Deposit Account No.: <u>07-1770</u> Date: <u>May 8, 2006</u> Name: <u>Beverly J. Artale</u> Signature:								

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference W 9558-01	FOR FURTHER ACTION		See item 4 below
International application No. PCT/US2005/039093	International filing date (<i>day/month/year</i>) 31 October 2005 (31.10.2005)	Priority date (<i>day/month/year</i>) 02 November 2004 (02.11.2004)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant W. R. GRACE & CO.- CONN.			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| ☒ | Box No. I | Basis of the report |
| ☐ | Box No. II | Priority |
| ☐ | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| ☐ | Box No. IV | Lack of unity of invention |
| ☒ | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| ☐ | Box No. VI | Certain documents cited |
| ☐ | Box No. VII | Certain defects in the international application |
| ☐ | Box No. VIII | Certain observations on the international application |

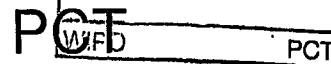
4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

		Date of issuance of this report 08 May 2007 (08.05.2007)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland		Authorized officer Philippe Becamel
Facsimile No. +41 22 338 82 70		e-mail: pt12.pct@wipo.int

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

REC'D 24 FEB 2006



To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/039093

International filing date (day/month/year)
31.10.2005

Priority date (day/month/year)
02.11.2004

International Patent Classification (IPC) or both national classification and IPC
C10G11/04, C10G11/18, B01J23/63, B01J23/78, B01J23/83, B01J23/96, B01J35/00, B01D53/86

Applicant
W. R. GRACE & CO.- CONN.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Harf, J

Telephone No. +49 89 2399-7845



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/039093

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/039093

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-15
Inventive step (IS)	Yes: Claims	
	No: Claims	1-15
Industrial applicability (IA)	Yes: Claims	1-15
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/039093

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: US 2004/074809 A1 (YALURIS GEORGE ET AL) 22 April 2004 (2004-04-22)
- D2: US-A-6 165 933 (PETERS ET AL) 26 December 2000 (2000-12-26)
- D3: US-A-4 290 878 (BLANTON, JR. ET AL) 22 September 1981 (1981-09-22)
- D4: US-A-4 300 997 (MEGUERIAN ET AL) 17 November 1981 (1981-11-17)

V.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-15 is not new in the sense of Article 33(2) PCT.

The document **D1** discloses (see passages cited in the International Search Report) a process for minimising reduced N-species and NO_x emissions from partial or incomplete combustion FCCU regenerators comprising the use of an oxidative additive comprising (i) at least 1 wt-% of an acidic metal oxide, (ii) at least 0.5 wt-% of an alkali or alkaline earth metal oxide, (iii) at least 0.1 wt-% of an oxygen storage metal oxide and (iv) at least 0.1 ppm of a noble metal such as Pt, Pd, Rh, Ir, Os, Ru or Re. This document describes (Examples 4 and 7) the treatment in a regenerator test unit of a feed comprising NO and CO over an additive C consisting of 68.7% Al₂O₃, 4.9% SiO₂, 21.2% CeO₂, 4.9% Na₂O and 970 ppm Pd. The additives may be used as separate particles along with the cracking catalyst or may be incorporated into the cracking catalyst as component. The circulating catalyst inventory may contain CO combustion promoters based on supported Pt as additional catalytic material. The additive is used in an amount of 0.01-50 wt-% of the cracking catalyst inventory.

Hence, the catalytic additive of D1 is considered to contain all components of the NO_x reduction additive defined in independent **claim 1** of the present application.

The document D1 also appears to disclose all additional features of dependent **claims 2-15**.

Document D1 defines the full burn combustion mode of an FCCU regenerator as producing an oxygen excess and NO_x in the gas effluent. Depending on the oxygen flow

into the regenerator, this regenerator effluent gas further contains reduced nitrogen species such as ammonia and CO.

- V.2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-15 does not involve an inventive step in the sense of Article 33(3) PCT.

The document **D2** (see passages cited in the International Search Report), which is regarded as being the closest prior art to the subject-matter of independent claim 1, and discloses a process for reducing NO_x emission and promoting CO combustion in the regeneration step of a FCCU comprising the use of a cracker component and of a promoter component comprising (i) an acidic oxide support such as alumina, (ii) an alkali or alkaline earth metal such as Na (1-10 wt-%), (iii) a transition metal oxide such as Ceria (2-50 wt-%) for oxygen storage and (iv) Pd (>100 ppmw). The promoter component is either integrated into the FCC catalyst particles or as separate additive particles.

The subject-matter of claim 1 therefore differs from this known process of D2 in that the additive component further contains at least 0.1 ppm of a noble metal selected from Pt, Ir, Rh, Os, Ru, Rh and mixtures thereof.

The problem to be solved by the present invention may therefore be regarded as to provide a process for reducing NO_x emission and promoting CO combustion using an alternative additive.

The solution proposed in **claim 1** of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

The document **D4** (see passages cited in the International Search Report) discloses the use of a Pd-Ru (0.01-100 ppmw) oxidation promoter with a cracking catalyst to promote CO combustion while reducing NO_x formation in FCC catalyst regenerators.

In view of the teaching of D4, it would be obvious for the skilled person to combine the oxidation promoter of D4 with the promoter of D2 and thus obtain an additive comprising both Pd and Ru as second noble metal to provide the same advantage of reduced NO_x emissions and promoted CO combustion.

Dependent **claims 2-15** do not appear to contain any features which, in combination with

the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step.

The document **D3** (see passages cited in the International Search Report) discloses the use of Pt as CO combustion promoter and Rh or Ir as NOx suppressing agent in FCC catalyst regenerators.

This document could also serve in combination with document D2 for assessing the inventive step of the present invention.

- V.3 Example 7 of the present application shows the CO oxidation activity of additives A-C for the regeneration of a coked FCC catalyst blended with these additives. According to Table 3, additive A containing only Pd and thus not corresponding to an additive as defined in claim 1 achieves the lowest CO emissions.

Example 8 of the present application shows the reduction of NO emissions when blending additives A-C with a FCC catalyst for the regeneration of this catalyst. The additive A containing only Pd and thus not corresponding to an additive as defined in claim 1 appears to achieve a reduction of NO emissions equivalent to the one of additive C containing both Pd and Rh according to the invention (Figure 4).

Further, the effects shown in Examples 5 and 6 of the present application appear to depend on the oxygen flow into the regenerator (Figures 1 and 2).

Consequently, the present application is considered to lack unambiguous technical evidence showing the advantage an additive according to claim 1 offers over the promoter component of D2.

It should be pointed out, that alleged advantages to which the applicant merely refers, without offering sufficient evidence to support the comparison with the closest prior art, cannot be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step.

- V.4 Claims 6, 7 and 14 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved (cf. terms "the process promotes", "the process reduces" and "in an amount sufficient to"), which merely amounts to a statement of the underlying problem, without providing the technical features necessary

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for achieving this result.

- V.5 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D4 is not mentioned in the description, nor are these documents identified therein.