


Industria y Comercio

SUPERINTENDENCIA

PETITORIO

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO


No. 07-092512- -00000-0000

 Fecha: 2007-09-07 16:51:56 Dep. 2020 NUECREACIONE
 Tra. 11 PATENTEIYII Eve: 378 FASENACIONALI
 Act. 411 PRESENTACION Folios: 161

FORMULARIO UN
SOLICITUD DE PATENTE
PCT
ENTR
EN FASE NACIONAL

8/09/2007

SOLICITUD DE:

1

☒ Patente de Invención.

☐ Patente de Modelo de Utilidad.

☒ Capítulo I.

☐ Capítulo II.

2

**SOLICITANTE
(71)**

 Nombre : **MC**
MATERIAL
IVE PERFORMANCE

 sociedad c... iada y existente bajo las
 leyes del F... o de Nueva York, Estados
 Unidos d... érica.

 Dirección: 771 Old Saw Mill River Road,
 Bldg 769 Suite #300,
 Tarrytown,
 New York 10591,
 Estados Unidos de América

 Domicilio: Tarrytown
 New York 10591,
 Estados Unidos de América

IDENTIFICACIÓN

 C.C. ☐ NIT ☐

 C.E. ☐ Otro ☐

Cual _____

Número _____

3

**REPRESENTANTE
O APODERADO**

 Nombre: **EMILIO FERRERO**
 Dirección: Carrera 4ª. No. 72-35
 Teléfono: 347 36 11
 Fax: 211 86 50
 E-mail: clientes@cavelier.com.
 Domicilio: Bogotá, Colombia.

IDENTIFICACIÓN

 C.C. ☒ NIT ☐

 C.E. ☐ Otro ☐

Cual _____

 Número 438.019 T.P 31.929

4

**INVENTOR (ES)
(72)**

 1. **Keith J. WELLER**
 4333 Ny Highway 43,
 North Greenbush,
 New York 12144,
 Estados Unidos de América

5

PCT (86)

 Solicitud Internacional No. PCT/US2006/004002

 Fecha: 06 de febrero de 2006

 Publicación Internacional No. WO 2006/086264 A1

 Fecha: 17 de agosto de 2006

6

Título (54)
**PROCESO PARA LA PRODUCCION DE POLIMERO RETICULADO QUE
 COMPRENDE EL RETICULADOR DE SILANO CON BAJA PRODUCCION DE VOC Y
 EL POLIMERO RETICULADO RESULTANTE**

7

Clasificación Internacional (51) C08K 005/054

8

Prioridad

 SI ☒ NO ☐

(33) País de Origen

US
US

(32) Fecha

08 de febrero de 2005
16 de noviembre de 2005

(31) Número de Solicitud

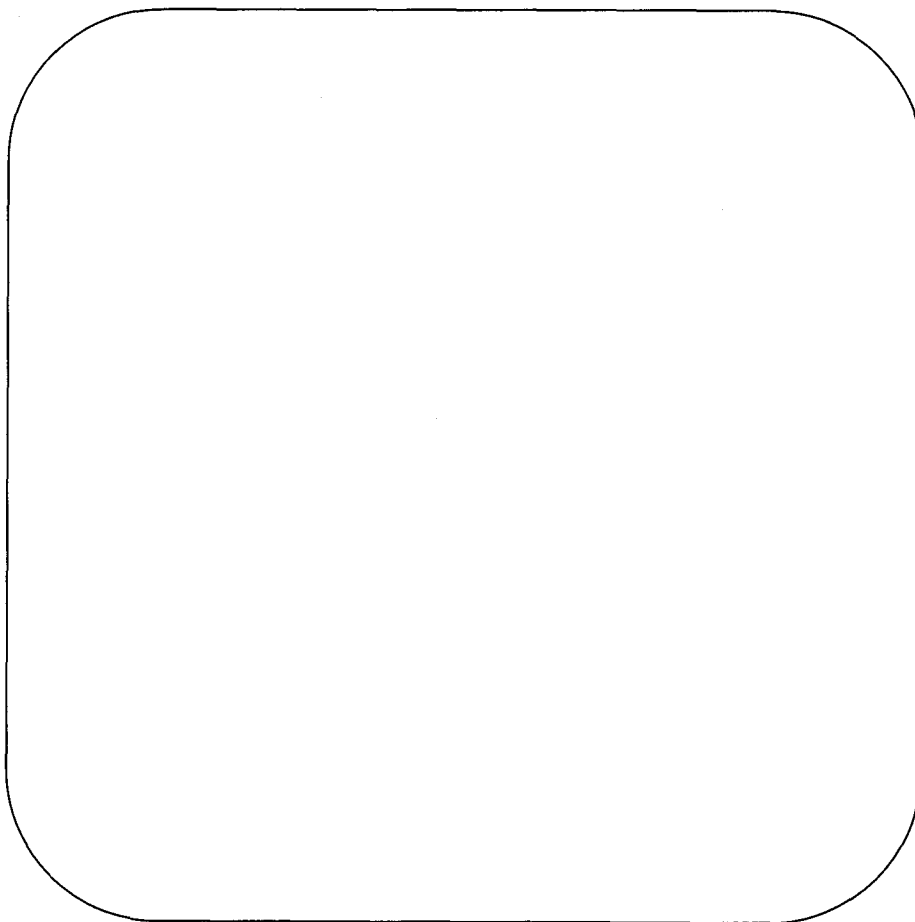
60/651,112
11/280,770

10

Anexos:

- ☒ Comprobante de pago de la tasa de presentación de la solicitud por \$ 482.000.00.
- ☐ Comprobante de pago por reivindicación de prioridad.
- ☐ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☐ Poderes, si fuere el caso.
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones.
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☐ Copia del examen preliminar efectuado por la IPEA.
- ☐ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☐ Arte final 12x12
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☒ Otros: VER HOJA DE DOCUMENTOS ANEXOS

11

FIGURA CARACTERÍSTICA

12

Solicito la concesión de la patente,

NOMBRE:EMILIO FERRERO

3
3**DOCUMENTOS ANEXOS**

1. ☒ Publicación Internacional WO 2006/086264 A1

Descripción:

Páginas 49 en el idioma original

Páginas 68 en español

Reivindicaciones: Número (s) 42

Figuras: Número (s) 4

2. ☒ **Forma PCT/ISA/210.** Informe de Búsqueda Internacional.

3. ☒ **Forma PCT/IB/306.** Notificación de la inscripción de un cambio de solicitante de GENERAL ELECTRIC COMPANY a MOMENTIVE PERMORANCE MATERIALS, INC.

4. ☒ Extracto de publicación.

**NO SE REALIZARON MODIFICACIONES EN LA FASE
INTERNACIONAL**

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
17 August 2006 (17.08.2006)

PCT

(10) International Publication Number
WO 2006/086264 A1

(51) International Patent Classification:

C08K 5/54 (2006.01) C08K 5/5415 (2006.01)

(21) International Application Number:

PCT/US2006/004002

(22) International Filing Date: 6 February 2006 (06.02.2006)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/651,112 8 February 2005 (08.02.2005) US
11/280,770 16 November 2005 (16.11.2005) US

(71) Applicant (for all designated States except US): **GENERAL ELECTRIC COMPANY** [US/US]; (A NEW YORK CORPORATION), 1 River Road, Schenectady, New York 12345 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **WELLER, Keith, J.** [US/US]; 4333 Ny Highway 43, North Greenbush, New York 12144 (US).

(74) Agents: **WINTER, Catherine, J.** et al.; GENERAL ELECTRIC COMPANY, GLOBAL PATENT OPERATION, 187 Danbury Road, Suite 204, Wilton, Connecticut 06897 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PROCESS FOR THE PRODUCTION OF CROSSLINKED POLYMER COMPRISING LOW VOC-PRODUCING SILANE CROSSLINKER AND RESULTING CROSSLINKED POLYMER

(57) Abstract: A process for crosslinking polymers employs a silane crosslinker which, upon hydrolysis, produces a reduced quantity of volatile organic compound.

WO 2006/086264 A1

PROCESS FOR THE PRODUCTION OF CROSSLINKED POLYMER COMPRISING LOW VOC-PRODUCING SILANE CROSSLINKER AND RESULTING CROSSLINKED POLYMER

CROSS-REFERENCE TO RELATED APPLICATION

The present invention claims priority to U.S. provisional application Serial No. 60/651,112 filed on February 8, 2005, the contents of which are incorporated by reference herein.

BACKGROUND OF THE INVENTION

The use of alkoxy-functional silanes for the crosslinking of polymers, especially for the production of pipes, foams, wires and cables, and heat-shrinkable tubing, results in the release of alcohol upon the hydrolysis of the silane. This alcohol is typically methanol or ethanol, and can pose environmental, health, and safety concerns. As the emission of volatile organic compounds (VOCs) becomes more tightly regulated, compounders and pipe, foam, tubing, wire and cable producers are many times forced to reduce production, install recovery or remediation equipment, or use special engineering controls to meet new, stricter emission limits as well as mitigate explosions or flammability hazards. As an example, potable water pipe manufactures are facing increasing limitations on allowable methanol content in as-produced pipes. These producers need a more cost-effective way to reduce the presence and emission of VOCs from their processes that employ conventional silanes.

Silanes are commonly employed as crosslinkers for the production of PEX-b pipe (silane crosslinked polyethylene), wire coatings, insulation jacketing for low- and medium-voltage cables, foams for insulation, and heat shrinkable products such as tubing. The silane is typically used in conjunction with a peroxide, which is used to effect grafting of the silane onto the polymer it will be crosslinking. Other additives, such as anti-oxidants, metal de-activators, condensation catalysts and so forth can also be included.

66

The most commonly employed silanes are vinyl-functional silanes with vinyltrimethoxy silane being the most prevalent. The production of crosslinked polymers involves grafting the silane onto the polymer and hydrolysis and condensation of the silane to provide crosslinked polymers. The grafting reaction is typically performed in a single screw extruder, while the hydrolysis/condensation reaction can be done under a variety of conditions, including exposure to moisture under ambient conditions, exposure to hot water via submersion of the grafted resin, or exposure to steam. In the production of potable water pipes, for example, hot water is circulated through the extruded pipe to complete the crosslinking. The circulation of hot water for an extended period also helps to remove the by-product methanol that is generated during the crosslinking. It is necessary to circulate water through the pipes until the methanol levels have decreased below allowable limits.

Silane crosslinking of polymers can lead to many improvements in chemical resistance, abrasion resistance, high temperature deformation resistance, wet and dry electrical properties, scratch resistance, tensile strength, flexural strength, creep, stress rupture properties, memory effect, impact strength, resistance to ageing, reduced drip phenomena, and other mechanical properties.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with the present invention, a process is provided for crosslinking a polymer which comprises:

- a) introducing into the structure of thermoplastic polymer to be crosslinked under substantially anhydrous conditions a silane which, upon hydrolysis of its hydrolyzable sites, produces a reduced amount of volatile organic compound compared to that produced by the hydrolysis of a silane possessing an equivalent number, per mole, of hydrolyzable sites all of which are hydrolyzable alkoxy groups; and,
- b) crosslinking the polymer by exposure of the polymer to hydrolysis/condensation conditions, optionally, in the presence of a hydrolysis/condensation catalyst.

PCT/US06/04002

The subject invention also includes the crosslinked polymer resulting from the aforesaid crosslinking process and products fabricated therefrom.

The silane employed in the process of this invention achieves crosslinking in a similar fashion to the silane previously utilized for the crosslinking of polymers but has the advantage of producing no significant amount of VOCs with consequent benefits for health and safety concerns of the work environment. Further, the silane used in the present invention reduces the need for recovery and remediation equipment and use of special engineering controls to meet new, stricter emission limits as well as mitigate explosion, flammability, and health hazards. Accordingly, use of the silane in the process of the present invention results in significant economic benefits as well as compared to known polymer crosslinking processes which utilize VOC producing silane.

The expression "volatile organic compound" (VOC) as used herein shall be understood to apply to and designate substantially pure organic compounds that are volatile per EPA (Environmental Protection Agency) method 24 for the United States or do not meet specific criteria established for countries within Europe with respect to vapor pressure or boiling point or are cited as VOCs in European Union Directive 2004/42/EC. Specific examples for such VOCs include methanol, ethanol, propanol, isopropanol, acetoxysilanes, etc.

Various other features, aspects and advantages of the present invention, will become more apparent with reference to the following description and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a chart illustrating the percent gel content of Examples 23-30 and Comparative Examples 11-14.

Figure 2 is a chart illustrating the tensile stress at break of Examples 23-30 and Comparative Examples 11-14.

Figure 3 is a chart illustrating the percentage elongation at break of Example 23-30 and Comparative Examples 11-14.