



(51) International Patent Classification:

C09D 5/18 (2006.01) *C09D* 7/12 (2006.01)
C09D 201/00 (2006.01)

(21) International Application Number:

PCT/US2016/015289

(22) International Filing Date:

28 January 2016 (28.01.2016)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/108,893 28 January 2015 (28.01.2015) US

(71) Applicant: **THE TEXAS A&M UNIVERSITY SYSTEM** [US/US]; 3369 TAMU, College Station, Texas 77843-3369 (US).

(72) Inventors: **GRUNLAN, Jaime C.**; 902 Hawthorne Street, College Station, Texas 77840 (US). **LEISTNER, Marcus**; 3123 Texas A&M University, College Station, Texas 77843-3123 (US). **HAILE, Merid M.**; 1806 Yellowhouse Circle Apt G, College Station, Texas 77840 (US).

(74) Agent: **TUMEY, Tod T.**; TumeY LLP, P.O. Box 22188, Houston, Texas 77227 (US).

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

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

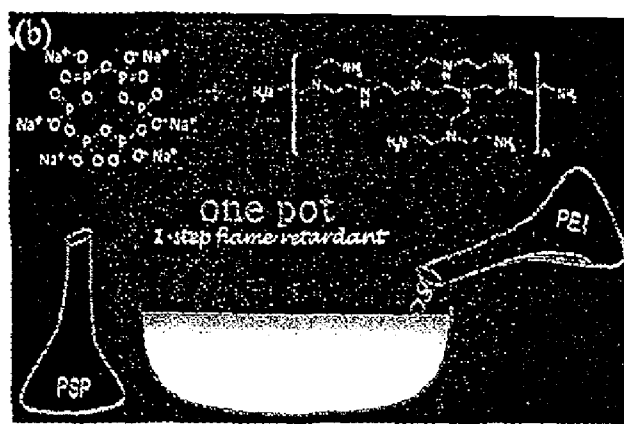
Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

6 October 2016

(54) Title: WATERBORNE COMPLEX, COATING PROCEDURE AND USE AS A FLAME RETARDANT



(57) Abstract: A method includes coating a substrate to provide a flame resistant substrate. In an embodiment, the method includes preparing an aqueous solution. The aqueous solution comprises a phosphate material, a cationic material, and a water. The method further includes exposing the substrate to the aqueous solution to produce a coating on the substrate. The coating includes the cationic material and the phosphate material. The method also includes exposing the coating on the substrate to a melamine solution.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2016/015289**A. CLASSIFICATION OF SUBJECT MATTER****C09D 5/18(2006.01)i, C09D 201/00(2006.01)i, C09D 7/12(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C09D 5/18; B05D 5/12; B05D 7/06; A62D 1/00; B05D 1/36; C08L 101/06; C08L 75/08; C09K 21/10; A62C 3/00; C08L 1/02; C09D 201/00; C09D 7/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & keywords: flame resistant, phosphate material, cationic material, amine, amide, anionic material

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012-0295031 A1 (GRUNLAN, JAIME C.) 22 November 2012 See claims 1-2, 4, 6, 8; paragraphs [0038], [0041]-[0042], [0048].	1-21
A	US 7070704 B2 (KANG, JUNG et al.) 4 July 2006 See claim 1.	1-21
A	US 2009-0238957 A1 (CLANCY, TIMOTHY J.) 24 September 2009 See claim 1.	1-21
A	US 5749948 A (SCHOLZ, GUIDO et al.) 12 May 1998 See claims 1-2.	1-21
A	US 4246146 A (WOOD, LOUIS L. et al.) 20 January 1981 See claims 1, 8.	1-21



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

05 September 2016 (05.09.2016)

Date of mailing of the international search report

05 September 2016 (05.09.2016)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

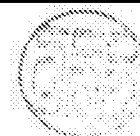
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

LEE, Dong Wook

Telephone No. +82-42-481-8163



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2016/015289

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2012-0295031 A1	22/11/2012	EP 2879809 A1 US 2015-0165478 A1 WO 2014-022407 A1	10/06/2015 18/06/2015 06/02/2014
US 7070704 B2	04/07/2006	AU 2003-206146 A1 KR 10-0457808 B1 KR 10-2003-0062707 A US 2005-0116193 A1 WO 03-059456 A1	30/07/2003 18/11/2004 28/07/2003 02/06/2005 24/07/2003
US 2009-0238957 A1	24/09/2009	AP 201005419 D0 AU 2009-225487 A1 AU 225487 B2 BR PI0910314 A2 CA 2719113 A1 EP 2257603 A2 EP 2257603 A4 EP 2257603 B1 ES 2430689 T3 MX 2010010227 A NZ 588042 A US 8703288 B2 WO 2009-117633 A2 WO 2009-117633 A3	31/10/2010 24/09/2009 16/01/2014 29/09/2015 24/09/2009 08/12/2010 31/08/2011 03/07/2013 21/11/2013 09/11/2010 24/02/2012 22/04/2014 24/09/2009 23/12/2009
US 05749948 A	12/05/1998	EP 0659850 A2 EP 0659850 B1 JP 07-252438 A	28/06/1995 06/05/1998 03/10/1995
US 04246146 A	20/01/1981	JP 55-120621 A	17/09/1980