



(51) International Patent Classification:

C07F 7/10 (2006.01) *C08J 7/04* (2006.01)
C07F 7/18 (2006.01)

(21) International Application Number:

PCT/US2013/028503

(22) International Filing Date:

1 March 2013 (01.03.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/681,023	8 August 2012 (08.08.2012)	US
61/681,003	8 August 2012 (08.08.2012)	US
61/681,008	8 August 2012 (08.08.2012)	US
61/681,051	8 August 2012 (08.08.2012)	US
61/680,995	8 August 2012 (08.08.2012)	US

(71) Applicant: **3M INNOVATIVE PROPERTIES COMPANY** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).

(72) Inventors; and

(71) Applicants : **KLUN, Thomas P.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). **NACHTIGAL, Alan K.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). **SPAGNOLA, Joseph C.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).

(US). **ROEHRIG, Mark A.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). **SCHNOBRICH, Jennifer K.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). **JOLY, Guy D.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US). **LYONS, Christopher S.** [US/US]; 3M Center, Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).

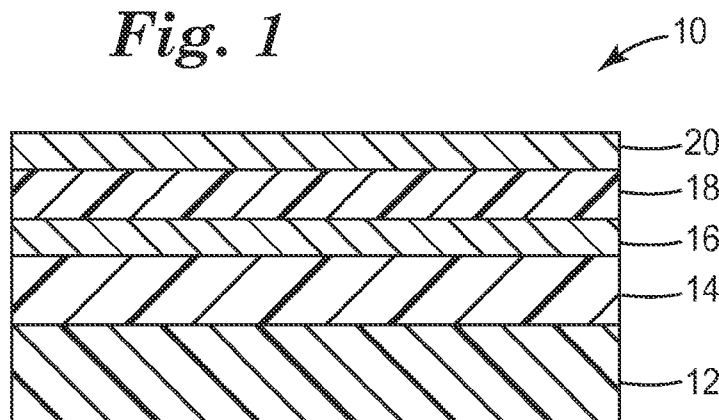
(74) Agents: **BAKER, James A.** et al.; 3M Center, Office of Intellectual Property Counsel Post Office Box 33427, Saint Paul, Minnesota 55133-3427 (US).

(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, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, 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, 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, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

[Continued on next page]

(54) Title: UREA (MULTI)-(METH)ACRYLATE (MULTI)-SILANE COMPOSITIONS AND ARTICLES INCLUDING THE SAME

Fig. 1

(57) Abstract: Urea (multi)-(meth)acrylate (multi)-silane precursor compounds, synthesized by reaction of (meth)acrylated materials having isocyanate functionality with aminosilane compounds, either neat or in a solvent, and optionally with a catalyst, such as a tin compound, to accelerate the reaction. Also described are articles including a substrate, a base (co)polymer layer on a major surface of the substrate, an oxide layer on the base (co)polymer layer; and a protective (co)polymer layer on the oxide layer, the protective (co)polymer layer including the reaction product of at least one urea (multi) (meth)acrylate (multi)-silane precursor compound synthesized by reaction of (meth)acrylated materials having isocyanate functionality with aminosilane compounds. The substrate may be a (co)polymer film or an electronic device such as an organic light emitting device, electrophoretic light emitting device, liquid crystal display, thin film transistor, or combination thereof. Methods of making the urea (multi)-(meth)acrylate (multi)-silanes and their use in composite films and electronic devices are described.



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, ML, MR, NE, SN, TD, TG).

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*