

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 December 2005 (15.12.2005)

PCT

(10) International Publication Number
WO 2005/118604 A1

(51) International Patent Classification⁷: **C07F 9/6574**,
C09K 21/14, C08G 59/14

(21) International Application Number:
PCT/US2005/017954

(22) International Filing Date: 20 May 2005 (20.05.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/575,602 28 May 2004 (28.05.2004) US

(71) Applicant (for all designated States except US): **DOW GLOBAL TECHNOLOGIES INC.** [US/US]; Washington Street, 1790 Building, Midland, MI 48674 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **GAN, Joseph** [FR/FR]; 58 Rue Staedel, Strasbourg 67100 (FR).

(74) Agent: **PRIETO, Joe, R.**; The Dow Chemical Company, Intellectual Property, P.O. Box 1967, Midland, MI 48641-1967 (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, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, 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, 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).

Published:
— with international search report

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: PHOSPHORUS-CONTAINING COMPOUNDS USEFUL FOR MAKING HALOGEN-FREE, IGNITION-RESISTANT POLYMERS

(57) Abstract: Phosphorus-containing compounds are disclosed which are obtainable by reacting: (A) at least one organophosphorus compound having a group selected from the group H-P=O; the group P-H and the group P-OH; and (B) at least one compound having the following Formula (I): Formula (I) $[R'(Y)_m]_n(X-O-R'')_n$ wherein R' is an organic group; Y is a functional group selected from hydroxy, carboxylic acid, carboxylate, acid anhydride, and amine; -SH, -SO₃H, -CONH₂, -NHCOOR, phosphite and phosphinate groups X is a hydrocarbylene group; R'' is hydrogen or a hydrocarbyl group having from 1 to 8 carbon atoms, R is alkyl or aryl group having from 1 to 12 carbon atoms; m', m and n are, independently, numbers equal to or greater than 1. These compounds are useful for making flame retardant epoxy and polyurethane resins and ignition resistant thermoplastic resins, each of which is useful for a variety of end uses requiring flame retardancy or ignition resistance. Flame retardant epoxy resins may be used to make electrical laminates. Flame retardant polyurethane is useful for making rigid polyurethane foam used in construction and flexible polyurethane foam used to make vehicle upholstery. Ignition resistant thermoplastic resins are useful for making television cabinets, computer monitors, printer housings, automotive parts, and housings and parts for appliances. This invention is particularly useful in end use applications in which a low bromine or low halogen content is required or desired.



WO 2005/118604 A1