



(51) International Patent Classification:

C08K 3/04 (2006.01) *C01B 31/02* (2006.01)
C08J 3/20 (2006.01) *C08L 79/08* (2006.01)
C08J 5/00 (2006.01) *B82B 3/00* (2006.01)

(21) International Application Number:

PCT/US2012/047445

(22) International Filing Date:

19 July 2012 (19.07.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/510,352 21 July 2011 (21.07.2011) US

(71) Applicant (for all designated States except US): **ENTEGRIS, INC.** [US/US]; 129 Concord Road, Billerica, MA 01821 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **GALLOWAY, Jeffrey, A.** [US/US]; C/o Entegris, Inc., 129 Concord Road, Billerica, MA 01821 (US).(74) Agents: **CHRISTENSEN, Douglas, J.** et al.; Patterson Thunte Christensen Pedersen, P.A., 4800 IDS Center, 80 South Eighth Street, Minneapolis, MN 55402-2100 (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, 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, 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, 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).

Published:

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

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

2 May 2013

(15) Information about Correction:

[Continued on next page]

(54) Title: NANOTUBE AND FINELY MILLED CARBON FIBER POLYMER COMPOSITE COMPOSITIONS AND METHODS OF MAKING

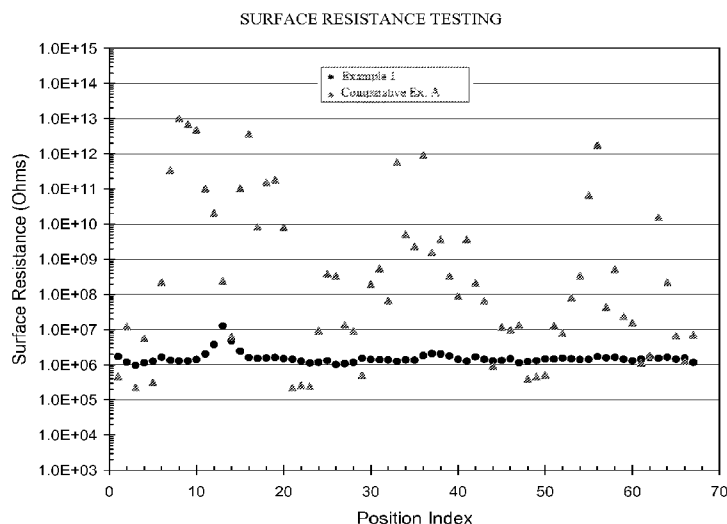


FIG. 7B

(57) Abstract: Embodiments of the present invention include composite compositions extrusion compounded together comprising a polymer, an amount of nanotubes, and an amount of finely milled carbon fiber having an aspect ratio greater than 1 and less than about 5. The resulting composite materials allow for high carbon loading levels with improved tribological properties including coefficient of friction and wear rates, provides uniform surface resistance with minimal processing sensitivity, retains rheological properties similar to the base resin, and provides isotropic shrink and a reduced coefficient of thermal expansion leading to minimal warp. In general, various articles can be formed that take advantage of the properties of the composite materials incorporating a polymer, carbon nanotubes and finely milled carbon fiber.



Previous Correction:

see Notice of 14 March 2013