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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
6 September 2013 (06.09.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/128313 A1

(51) **International Patent Classification**:
G03F 7/00 (2006.01) *G03F 7/004* (2006.01)

(21) **International Application Number**:
PCT/IB2013/051128

(22) **International Filing Date**:
12 February 2013 (12.02.2013)

(25) **Filing Language**: English

(26) **Publication Language**: English

(30) **Priority Data**:
13/405,587 27 February 2012 (27.02.2012) US

(71) **Applicant**: **INTERNATIONAL BUSINESS MACHINES CORPORATION** [US/US]; New Orchard Road, Armonk, New York 10504 (US).

(71) **Applicants** *(for MG only)*: **IBM UNITED KINGDOM LIMITED** [GB/GB]; PO Box 41, North Harbour, Portsmouth Hampshire PO6 3AU (GB). **IBM (CHINA) INVESTMENT COMPANY LIMITED** [CN/CN]; 25/F, Pangu Plaza, No.27, Central North 4th Ring Road, Chaoyang District, Beijing 100101 (CN).

(72) **Inventors**: **BASS, John, David**; IBM Corporation, c/o Almaden Research Center, Intellectual Property Law, C4TA/2JB, 650 Harry Road, San Jose, California 95120-6099 (US). **SUNDBERG, Linda, Karin**; IBM Corporation, M/P K17/E1, Almaden Research Center, 650 Harry Road, San Jose, California 95120-6099 (US). **WALLRAFF, Gregory, Michael**; IBM Corporation, M/P K17/E1, Almaden Research Center, 650 Harry Road, San Jose, California 95120-6099 (US). **MILLER, Robert, Dennis**; IBM Corporation, M/P E1-302, Almaden Research Center, 650 Harry Road, San Jose, California 95120-6099 (US). **KIM, Ho-Cheol**; IBM Corporation, M/P K17/E1, Almaden Research Center, 650 Harry Road, San Jose, California 95120-6099 (US). **SONG, Qing**; IBM Corporation, M/P K17F/E1, Almaden Research Center, 650 Harry Road, San Jose, California 95120-6099 (US).

(74) **Agent**: **WILLIAMS, Julian**; IBM United Kingdom Limited, Intellectual Property Law, Hursley Park, Winchester Hampshire SO21 2JN (GB).

(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, 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))*

— *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))*

WO 2013/128313 A1

(54) **Title**: METAL PEROXO COMPOUNDS WITH ORGANIC CO-LIGANDS FOR ELECTRON BEAM, DEEP UV AND EXTREME UV PHOTORESIST APPLICATIONS

(57) **Abstract**: Compositions are disclosed having the formula (3): $[C']_k[Ta(O_2)_x(L')_y]$ (3), wherein x is an integer of 1 to 4, y is an integer of 1 to 4, $Ta(O_2)_x(L')_y$ has a charge of 0 to -3, C' is a counterion having a charge of + 1 to +3, k is an integer of 0 to 3, L' is an oxidatively stable organic ligand having a charge of 0 to -4, and L' comprises an electron donating functional group selected from the group consisting of carboxylates, alkoxides, amines, amine oxides, phosphines, phosphme oxides, arsine oxides, and combinations thereof. The compositions have utility as high resolution photoresists.