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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 October 2010 (21.10.2010)

PCT

(10) International Publication Number
WO 2010/120631 A3

(51) International Patent Classification:
H01L 31/042 (2006.01) *H01L 31/18* (2006.01)

(21) International Application Number:
PCT/US2010/030456

(22) International Filing Date:
9 April 2010 (09.04.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/385,572 13 April 2009 (13.04.2009) US

(71) Applicant *(for all designated States except US)*: **MIASOLE** [US/US]; 2590 Walsh Avenue, Santa Clara, CA 95051 (US).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **MACKIE, Neil, M.** [US/US]; c/o Miasole, 2590 Walsh Avenue, Santa Clara, CA 95051 (US).

(74) Agents: **RADOMSKY, Leon** et al.; Foley & Lardner LLP, 3000 K Street NW, Washington, DC 20007 (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, RO, RS, RU, 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, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, 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:
24 February 2011

(54) Title: METHOD AND APPARATUS FOR CONTROLLABLE SODIUM DELIVERY FOR THIN FILM PHOTOVOLTAIC MATERIALS

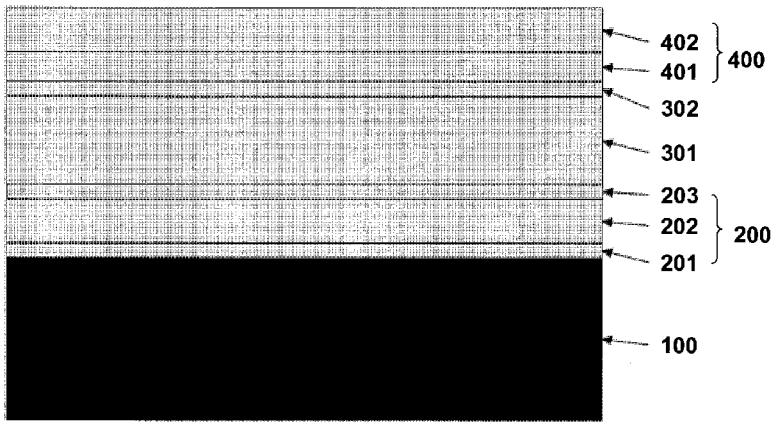


Figure 1

(57) Abstract: A solar cell includes a substrate, a first electrode located over the substrate, where the first electrode comprises a first transition metal layer, at least one p-type semiconductor absorber layer located over the first electrode, an n-type semiconductor layer located over the p-type semiconductor absorber layer, and a second electrode located over the n-type semiconductor layer. The first transition metal layer contains (i) an alkali element or an alkali compound and (ii) a lattice distortion element or a lattice distortion compound. The p-type semiconductor absorber layer includes a copper indium selenide (CIS) based alloy material.

WO 2010/120631 A3