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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
25 July 2013 (25.07.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/109955 A1

(51) International Patent Classification:
H01L 27/14 (2006.01) *H01L 27/12* (2006.01)

(21) International Application Number:
PCT/US2013/022244

(22) International Filing Date:
18 January 2013 (18.01.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/588,080 18 January 2012 (18.01.2012) US

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(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))*

(54) **Title**: VERTICAL INTEGRATION OF CMOS ELECTRONICS WITH PHOTONIC DEVICES

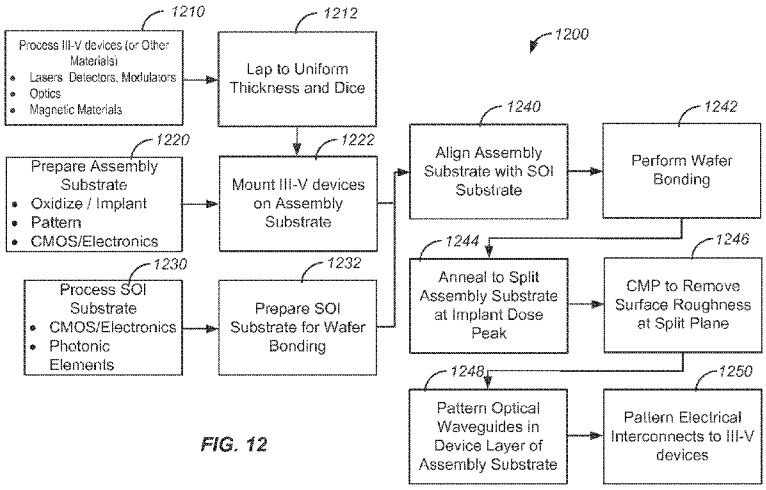


FIG. 12

(57) **Abstract**: A method of fabricating a composite semiconductor structure includes providing an SOI substrate including a plurality of silicon-based devices, providing a compound semiconductor substrate including a plurality of photonic devices, and dicing the compound semiconductor substrate to provide a plurality of photonic dies. Each die includes one or more of the plurality of photonics devices. The method also includes providing an assembly substrate having a base layer and a device layer including a plurality of CMOS devices, mounting the plurality of photonic dies on predetermined portions of the assembly substrate, and aligning the SOI substrate and the assembly substrate. The method further includes joining the SOI substrate and the assembly substrate to form a composite substrate structure and removing at least the base layer of the assembly substrate from the composite substrate structure.

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