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

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
06 September 2019 (06.09.2019)

WIPO | PCT

(10) International Publication Number
WO 2019/166875 A8

(51) International Patent Classification:
G02F 1/017 (2006.01) *G02F 1/025* (2006.01)

(21) International Application Number:
PCT/IB2019/000188

(22) International Filing Date:
26 February 2019 (26.02.2019)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/635,955 27 February 2018 (27.02.2018) US
PCT/EP2018/062269
11 May 2018 (11.05.2018) EP
62/675,050 22 May 2018 (22.05.2018) US

(71) Applicant: **ROCKLEY PHOTONICS LIMITED** [GB/GB]; c/o Cooley (UK) LLP, 10th Floor, Dashwood, 69 Old Broad Street, London EC2M 1QS (GB).

(72) Inventors: **YU, Guomin**; 417 West Bagnall Street, Glendora, CA 91740 (US). **ZILKIE, Aaron, John**; 2190 Paloma Street, Passadena, CA 91104 (US).

(74) Agent: **GRAHAM, Emma**; Mewburn Ellis LLP, City Tower, 40 Basinghall Street, London EC2V 5DE (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, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, 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, SA, 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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

(54) Title: ELECTRO-ABSORPTION MODULATOR

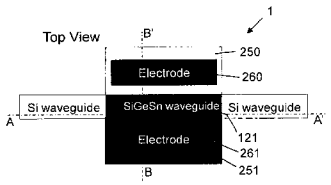
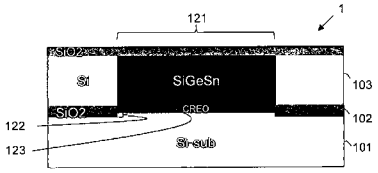
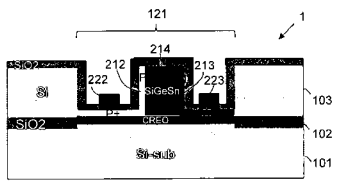


Fig. 1A



A – A', section view along light propagation
Fig. 1B



B – B', cross section view
Fig. 1C

(57) Abstract: An optoelectronic device comprising: a silicon-on-insulator (SOI) substrate, the substrate comprising: a silicon support layer; a buried oxide (BOX) layer on top of the silicon support layer; and a silicon device layer on top of the BOX layer; a waveguide region, where a portion of the silicon device layer and a portion of the BOX layer underneath the portion of the device layer have been removed, the portion of the BOX layer having been replaced with a layer of silicon and a layer of crystalline oxide on top of the silicon; and a waveguide structure located directly on top of the crystalline oxide layer, the waveguide structure including a P doped region, and an N doped region with an intrinsic region in-between, creating a PIN junction across which a bias can be applied to create a modulation region.

WO 2019/166875 A8

[Continued on next page]

Published:
— *with international search report (Art. 21(3))*

(48) Date of publication of this corrected version:
22 October 2020 (22.10.2020)

(15) Information about Correction:
see Notice of 22 October 2020 (22.10.2020)