

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
20 August 2020 (20.08.2020)



(10) International Publication Number
WO 2020/165051 A1

(51) International Patent Classification:
H01L 21/02 (2006.01)

(21) International Application Number:
PCT/EP2020/053185

(22) International Filing Date:
07 February 2020 (07.02.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/806,378 15 February 2019 (15.02.2019) US
16/782,296 05 February 2020 (05.02.2020) US

(71) Applicant: **IQE PLC** [GB/GB]; Pascal Close St. Mellons,
Cardiff CF3 0LW (GB).

(72) Inventors: **CLARK, Andrew**; 192 Preston Drive, Mountain View, CA 94040 (US). **PELZEL, Rodney**; IQE-Pennsylvania, 119 Technology Drive, Bethlehem, PA 18015 (US). **DEBNATH, Mukul**; 8204 Patterdale Close, Stokesdale, NC 27357 (US). **DARGIS, Rytis**; IQE-North Carolina 494 Gallimore Dairy Rd., Greensboro, NC 27409 (US). **YANKA, Robert**; IQE-North Carolina 494 Gallimore Dairy Rd., Greensboro, NC 27409 (US).

(74) Agent: **HANSON, Kevin** et al.; 26-28 Bedford Row, London WC1R 4HE (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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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).

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: A Pnictide NANOCOMPOSITE STRUCTURE FOR LATTICE STABILIZATION

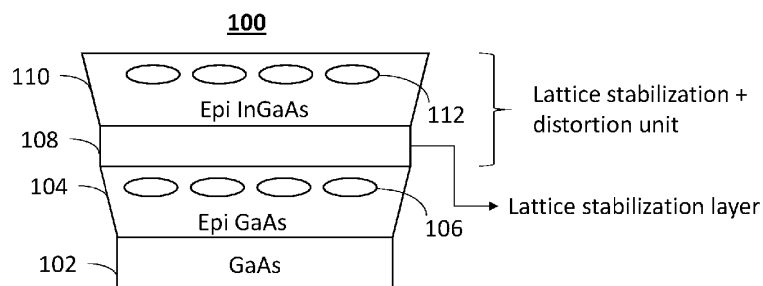


FIG. 1

(57) Abstract: A layered structure for semiconductor application is described herein. The layered structure includes III-V semiconductor and uses pnictide nanocomposites to control lattice distortion in a series of layers. The distortion is tuned to bridge lattice mismatch between binary III-V semiconductors. In some embodiments, the layered structure further includes dislocation filters.



WO 2020/165051 A1