

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
19 September 2024 (19.09.2024)



(10) International Publication Number
WO 2024/191347 A1

(51) International Patent Classification:

G02B 1/00 (2006.01) B82Y 20/00 (2011.01)
G02F 1/1335 (2006.01)

(21) International Application Number:

PCT/SG2024/050095

(22) International Filing Date:

22 February 2024 (22.02.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202300705Q 14 March 2023 (14.03.2023) SG

(71) Applicant: AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH [SG/SG]; 1 Fusionopolis Way, #20-10, Connexis North, Singapore 138632 (SG).

(72) Inventors: MARUTHIYODAN VEETIL, Rasna; c/o 2 Fusionopolis Way, Innovis, #08-03, Singapore 138634 (SG). PANIAGUA DOMINGUEZ, Ramon Jose; c/o 2 Fusionopolis Way, Innovis, #08-03, Singapore 138634

(SG). KUZNETSOV, Arseniy; c/o 2 Fusionopolis Way, Innovis, #08-03, Singapore 138634 (SG).

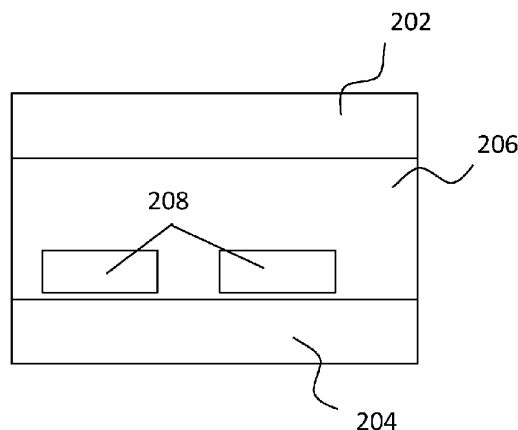
(74) Agent: CSASIA IP PTE. LTD.; 47 Scotts Road, #13-03, Goldbell Towers, Singapore 228233 (SG).

(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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, 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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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,

(54) Title: LIQUID CRYSTAL DEVICE AND METHOD OF FORMING THE SAME

FIG. 2



(57) Abstract: Various embodiments may relate to a liquid crystal (LC) device. The liquid crystal (LC) device may include a first electrode. The liquid crystal (LC) device may also include a second electrode. The liquid crystal (LC) device may further include a liquid crystal layer between the first electrode and the second electrode, the liquid crystal layer including liquid crystal molecules and an array of nanostructures adapted to cause a desired alignment of the liquid crystal molecules and to modulate light passing through the liquid crystal device. A periodicity of the array of nanostructures or an aspect ratio of each nanostructure of the array of nanostructures may be adapted to cause the desired alignment of the liquid crystal molecules.

[Continued on next page]

LU, LV, MC, ME, 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).

Declarations under Rule 4.17:

- *of inventorship (Rule 4.17(iv))*

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))*