

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
14 July 2022 (14.07.2022)



(10) International Publication Number
WO 2022/150816 A1

(51) International Patent Classification:

G02B 1/00 (2006.01) H01L 27/14 (2006.01)
G02B 1/10 (2015.01) H01L 33/58 (2010.01)

(21) International Application Number:

PCT/US2022/070043

(22) International Filing Date:

05 January 2022 (05.01.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/134,372 06 January 2021 (06.01.2021) US

(71) Applicant: **METALENZ, INC.** [US/US]; 205 Portland Street, Suite 500, Boston, MA 02114 (US).

(72) Inventors: **LATAWIEC, Pawel**; 2 Earhart Street, Unit 409, Cambridge, MA 02141 (US). **FOROUZMAND, Seyedali**; 4 Longfellow Place, Apartment 2701, Boston, MA 02114 (US).

(74) Agent: **HSU, Kendrick, S.**; KPPB LLP, 2190 S. Towne Centre Place, Suite 300, Anaheim, CA 92806 (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, 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, IT, 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: SELF-ALIGNED NANO-PILLAR COATINGS AND METHOD OF MANUFACTURING

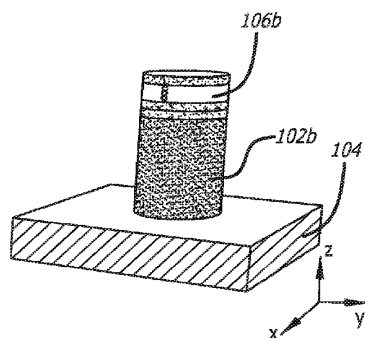


FIG. 1B

(57) Abstract: Meta-surface devices may be advantageously used for miniaturization, planar and thin film, high spatial resolution, and dense integration into optical devices. They have the potential to be used for steering a beam propagation direction, shaping wave-front light, and imparting information for application such as sensing, imaging, light detection, and ranging. However, meta-surface devices may have poor overall efficiency when compared with traditional optical devices. Embodiments of this disclosure relate to meta-surface devices including a pattern of high-index pillars with a low-index coating. Advantageously, the low-index coating may improve optical efficiency of the meta-surface devices which may make these meta-surface devices suitable for a variety of applications.