

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
03 April 2025 (03.04.2025)



(10) International Publication Number
WO 2025/071476 A1

(51) International Patent Classification:

H10N 30/057 (2023.01) H10N 30/50 (2023.01)
H10N 30/079 (2023.01) H10N 30/80 (2023.01)

(21) International Application Number:

PCT/SG2024/050556

(22) International Filing Date:

30 August 2024 (30.08.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202302727S 26 September 2023 (26.09.2023) SG

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

(72) Inventors: **VARGHESE, Binni**; c/o Institute of Micro-electronics, 2 Fusionopolis Way, #08-02, Innovis, Singa-

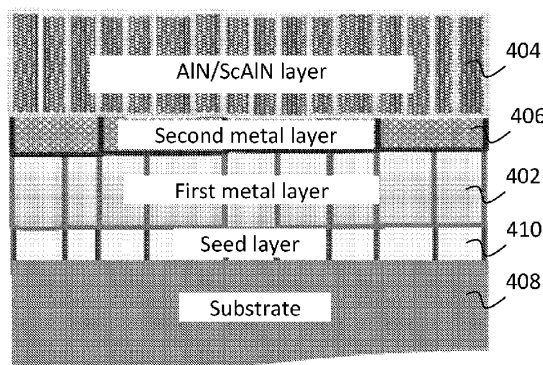
pore 138634 (SG). **LI, Minghua**; c/o Institute of Micro-electronics, 2 Fusionopolis Way, #08-02, Innovis, Singapore 138634 (SG). **SINGH, Navab**; c/o Institute of Micro-electronics, 2 Fusionopolis Way, #08-02, Innovis, Singapore 138634 (SG). **LIN, Huamao**; c/o Institute of Micro-electronics, 2 Fusionopolis Way, #08-02, Innovis, 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,

(54) Title: STACKED ARRANGEMENT, MICRO-ELECTROMECHANICAL DEVICE AND METHODS OF FORMING THE SAME

FIG. 4A



(57) Abstract: Various embodiments may relate to a method of forming a stacked arrangement. The stacked arrangement may include a metal electrode layer including a first material. The stacked arrangement may further include a piezoelectric layer. The stacked arrangement may also include a metal buffer layer having a first surface in contact with the metal electrode layer and a second surface, the second surface opposite the first surface, in contact with the piezoelectric layer. The metal buffer layer may include a second material different from the first material. An average grain size of grains of the metal buffer layer may be greater than an average grain size of grains of the metal electrode layer.

[Continued on next page]

WO 2025/071476 A1

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, 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))*