

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
10 October 2024 (10.10.2024)



(10) International Publication Number
WO 2024/210847 A1

(51) International Patent Classification:

H01M 4/62 (2006.01) H01G 11/56 (2013.01)
H01M 4/38 (2006.01) H01G 11/86 (2013.01)
H01G 11/30 (2013.01)

(21) International Application Number:

PCT/SG2024/050232

(22) International Filing Date:

04 April 2024 (04.04.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10202300952X 06 April 2023 (06.04.2023) SG

(71) Applicant: **NANYANG TECHNOLOGICAL UNIVERSITY** [SG/SG]; 50 Nanyang Avenue, Singapore 639798 (SG).

(72) Inventors: **GUPTA, Adit**; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG).
LEE, Pooi See; c/o Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798 (SG).

(74) Agent: **KINNAIRD, James Welsh**; Marks & Clerk Singapore LLP, Tanjong Pagar Post Office, P.O. Box 636, Singapore 910816 (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, 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))

(54) Title: HIGHLY STRETCHABLE ENERGY STORAGE DEVICES

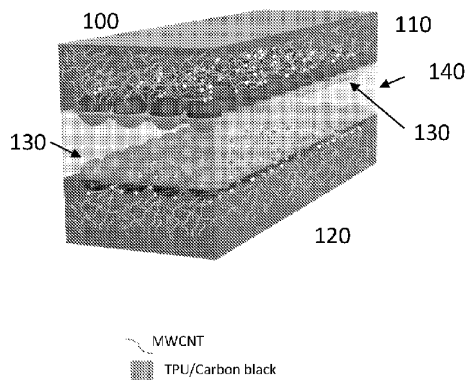


Fig. 10A

(57) Abstract: Disclosed herein is an elastomeric electrode film material, comprising: an elastomeric polymer matrix a conductive filler material; and a plurality of liquid metal particles, wherein the elastomeric electrode film material has a first surface and a second surface, and the plurality of liquid metal particles are dispersed on or adjacent to the first surface. Also disclosed herein is a liquid metal-based solid-state supercapacitor using the elastomeric electrode film material described herein, methods of formation of both and uses of said materials.

WO 2024/210847 A1