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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 May 2022 (27.05.2022)

WIPO | PCT

(10) International Publication Number
WO 2022/109019 A1

(51) International Patent Classification:
H01M 10/04 (2006.01) *H01M 50/477* (2021.01)
H01M 50/403 (2021.01) *H01M 50/489* (2021.01)
H01M 50/46 (2021.01) *H01M 50/497* (2021.01)
H01M 50/463 (2021.01) *H01M 10/0525* (2010.01)
H01M 50/474 (2021.01)

(21) International Application Number:
PCT/US2021/059716

(22) International Filing Date:
17 November 2021 (17.11.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/115,266 18 November 2020 (18.11.2020) US
63/115,578 18 November 2020 (18.11.2020) US

(71) Applicant: **ENOVIX OPERATIONS INC.** [US/US]; 3501 W. Warren Avenue, Fremont, California 94538 (US).

(72) Inventors: **DALTON, Jeremie J.**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **BUSACCA, Robert S.**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **LAHIRI, Ashok**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **RAMASUBRAMANIAN, Murali**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **VALDES, Bruno A.**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **LEE, Kim Han**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **CALCATERRA, Anthony**; 3501 W. Warren Avenue, Fremont, California 94538 (US). **CARDOZO, Benjamin L.**; 3501 W. Warren Avenue, Fremont, California 94538 (US).

(74) Agent: **BRENNAN, Patrick E.** et al.; Armstrong Teasdale LLP, 7700 Forsyth Blvd., Suite 1800, St. Louis, Missouri 63105 (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: SPACERS FOR ELECTRODES, ELECTRODE STACKS AND BATTERIES AND SYSTEMS AND METHODS THEREFOR

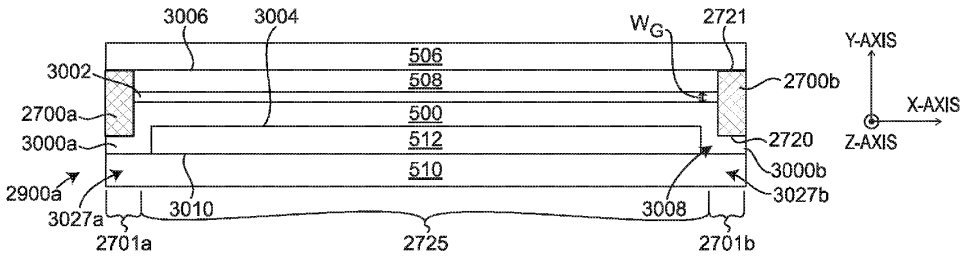


FIG. 30A

(57) Abstract: A battery includes an electrode assembly. The electrode assembly has a population of unit cells, each unit cell including an electrode current collector layer, an electrode layer, a separator layer, a counter-electrode layer, and a counter-electrode current collector layer in stacked succession. The electrode layer has an electrode active material, and the counter-electrode layer has a counter-electrode active material. One of the electrode active material and the counter-electrode material is a cathodically active material and the other of the electrode active material and the counter-electrode material is an anodically active material. A subset of the unit cell population includes a pair of spacer members located between the electrode current collector layer and the counter-electrode current collector layer. At least a portion of the counter-electrode active material is located between the spacer members in a common plane defined by the x and z axes.

WO 2022/109019 A1