

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
21 August 2008 (21.08.2008)

PCT

(10) International Publication Number
WO 2008/100441 A3

(51) International Patent Classification:

H01M 2/02 (2006.01) *H01M 10/36* (2006.01)
H01M 10/04 (2006.01) *H01M 10/38* (2006.01)
H01M 10/46 (2006.01) *H01M 2/10* (2006.01)
H02J 7/00 (2006.01)

(21) International Application Number:

PCT/US2008/001731

(22) International Filing Date: 8 February 2008 (08.02.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/889,264 9 February 2007 (09.02.2007) US

(71) Applicant (for all designated States except US): **CYMBET CORPORATION** [US/US]; 18326 Joplin Street N.W., Elk River, Minnesota 55330 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SATHER, Jeffrey, S.** [US/US]; 6171 Maclynn Ave. N.E., Otsego, Minnesota 55301 (US). **ROISEN, Roger, L.** [US/US]; 3470 Tuxedo Rd., Minnetrista, Minnesota 55364 (US). **MULLIN, Jeffrey, D.** [US/US]; 17757 Cleveland St. NW, Elk River, Minnesota 55330 (US).

(74) Agents: **CHAN, Alistair, K.** et al.; Kagan Binder, PLLC, Suite 200, Maple Island Building, 221 Main Street North, Stillwater, Minnesota 55082 (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, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: CHARGING SYSTEMS AND METHODS

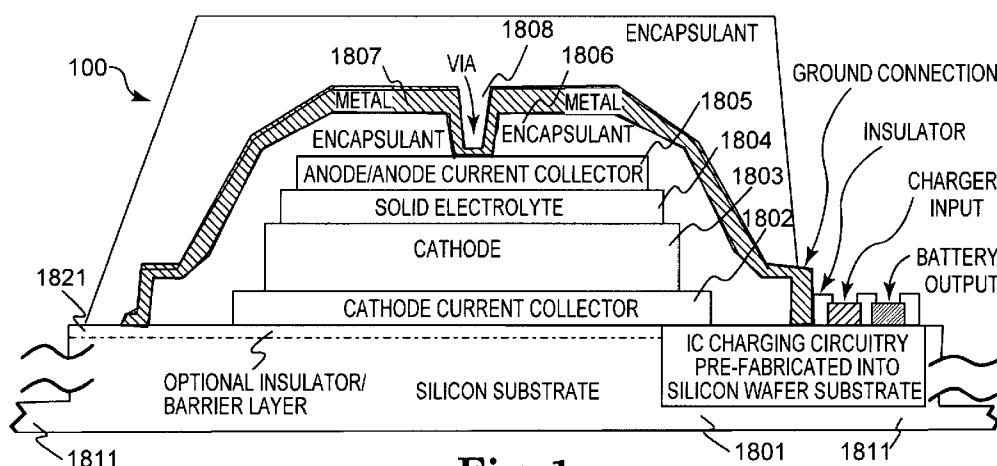


Fig. 1

(57) Abstract: A method and apparatus for a unitary battery and charging circuit that includes a first substrate having integrated-circuit battery-charging circuitry thereon, and a cathode material, an anode material, and an electrolyte layer separating the cathode material from the anode material deposited on the substrate to form a battery, wherein the charging circuit is connected to the battery and encapsulated to form a surface-mount unitary package. Also, a power conversion system that includes a variable charging source and an energy storage device. The power conversion system also includes a charging circuit coupled to the variable charging source and the energy storage device, the energy storage device being charged by the variable charging source. Further, the system includes an energy storage device isolation circuit configured to isolate the energy storage device from discharging when power from the variable charging source is below a predetermined threshold. Further still, the conversion system includes a restart circuit configured to restart the charging system by utilizing power from the energy storage device when charging power has dropped below a predetermined level.

WO 2008/100441 A3



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

16 April 2009