

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 May 2009 (14.05.2009)

PCT

(10) International Publication Number
WO 2009/061294 A1

(51) International Patent Classification:

H01M 8/04 (2006.01) *H01M 8/12* (2006.01)

H01M 8/10 (2006.01) *H01M 8/24* (2006.01)

(21) International Application Number:

PCT/US2007/023374

(22) International Filing Date:

6 November 2007 (06.11.2007)

(25) Filing Language:

English

(26) Publication Language:

English

(71) Applicant (for all designated States except US): **NANO-DYNAMICS ENERGY, INC.** [US/US]; 901 Fuhrmann Boulevard, Buffalo, NY 14203 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **DU, Yanhai** [NZ/US]; 370 Old Post Road, East Amherst, NY 14051 (US). **FINNERTY, Caine** [GB/US]; 21A Elk Terminal, Buffalo, NY 14204 (US).

(74) Agents: **BRODOWSKI, Michael, H.** et al.; Kirkpatrick & Lockhart Preston Gates Ellis LLP, State Street Financial Center, One Lincoln Street, Boston, MA 02111-2950 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, 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, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, 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

(54) Title: TUBULAR ELECTROCHEMICAL CELL

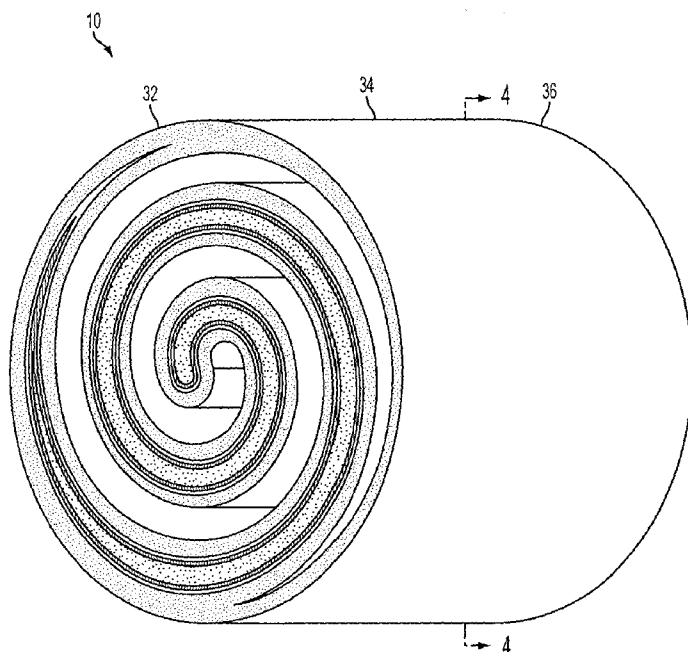


FIG. 3

(57) Abstract: The present teachings relate to an electrochemical cell having a closed Fermat spiral shape. The electrochemical cell comprises an anode, a cathode, an electrolyte, a fuel channel, an oxidant channel, and optionally a reforming layer. The electrochemical cell can be made through extrusion, gel-casting, or 3-D printing. The electrochemical cell can be a solid oxide fuel cell.