



- (51) International Patent Classification:
H01G 11/26 (2013.01) *H01G 11/54* (2013.01)
- (21) International Application Number:
PCT/US2015/050102
- (22) International Filing Date:
15 September 2015 (15.09.2015)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
14/509,950 8 October 2014 (08.10.2014) US
- (71) Applicant: **ANALOG DEVICES, INC.** [US/US]; One Technology Way, Norwood, Massachusetts 02062-9106 (US).
- (72) Inventors: **JIANG, Yingqi**; 20 Westgate Drive, Apt. 108, Woburn, Massachusetts 01801 (US). **YANG, Kuang L.**; 40 Van Roosen Road, Newton, Massachusetts 02459 (US).
- (74) Agents: **SAUNDERS, Steven G.** et al.; Sunstein Kann Murphy & Timbers LLP, 125 Summer Street, Boston, Massachusetts 02110-1618 (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, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, 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, SM, ST, SV, SY, TH, 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, 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))

- (88) Date of publication of the international search report:
16 June 2016

(54) Title: INTEGRATED SUPER-CAPACITOR

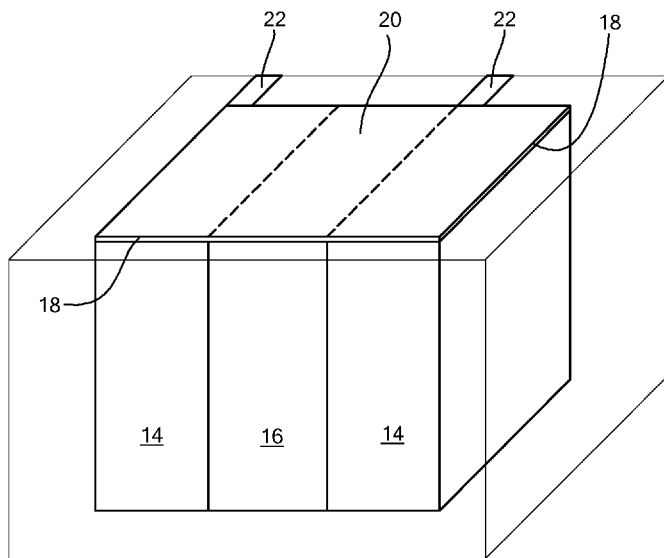


FIG. 1B

(57) Abstract: A super-capacitor has a substrate, at least two porous electrodes integrated within the substrate, and an electrolyte extending between the at least two porous electrodes. The electrolyte is integrated with the substrate, and is positioned within the substrate. The at least two porous electrodes and electrolyte are configured to store charge as a super-capacitor.



A. CLASSIFICATION OF SUBJECT MATTER**H01G 11/26(2013.01)i, H01G 11/54(2013.01)j**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01G 11/26; B05D 5/12; H01G 4/06; H01G 9/155; H01G 9/016; H01G 11/36; H01G 4/12; H01G 9/058; H01G 2/06; H01G 9/00; H01G 11/54

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: capacitor, porous, electrode, electrolyte, path, current, dimension, super, ultra, circuitry

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-1057410 B1 (FEMVIX) 17 August 2011 See abstract, paragraphs [0029]-[0030], [0051]-[0063], [0070]-[0080] and figures 1-2.	1-5, 9, 11-13, 15, 17-18, 20
Y		6-8, 10, 14, 16, 19
Y	US 2010-0195261 A1 (DANIEL C. SWEENEY et al.) 05 August 2010 See paragraphs [0044]-[0045] and figures 3, 6.	6-7, 14, 19
Y	US 2011-0019337 A1 (PO-JUI CHEN et al.) 27 January 2011 See paragraphs [0026]-[0038] and figures 3-6.	8, 10, 16
A	JP 2012-033899 A (SEMICONDUCTOR ENERGY LAB CO., LTD.) 16 February 2012 See abstract, paragraphs [0045]-[0088] and figures 1-3.	1-20
A	KR 10-1222873 B1 (VINA TECHNOLOY CO., LTD.) 25 January 2013 See abstract, paragraphs [0034]-[0058] and figures 1-4.	1-20

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

28 April 2016 (28.04.2016)

Date of mailing of the international search report

29 April 2016 (29.04.2016)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

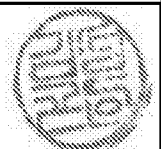
189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea

Facsimile No. +82-42-481-8578

Authorized officer

KIM, Sung Gon

Telephone No. +82-42-481-8746



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2015/050102

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 10-1057410 B1	17/08/2011	KR 10-2011-0000100 A	03/01/2011
US 2010-0195261 A1	05/08/2010	AU 2010-207975 A1	05/08/2010
		CA 2751213 A1	05/08/2010
		CN 102388149 A	21/03/2012
		EP 2391738 A2	07/12/2011
		EP 2392019 A2	07/12/2011
		EP 2392020 A2	07/12/2011
		EP 2392021 A2	07/12/2011
		JP 2012-516688 A	26/07/2012
		US 2010-0195263 A1	05/08/2010
		US 2010-0226066 A1	09/09/2010
		US 2010-0227325 A1	09/09/2010
		US 8259432 B2	04/09/2012
		WO 2010-088668 A2	05/08/2010
		WO 2010-088668 A3	23/09/2010
		WO 2010-088684 A2	05/08/2010
		WO 2010-088684 A3	25/11/2010
		WO 2010-088685 A2	05/08/2010
		WO 2010-088685 A3	25/11/2010
		WO 2010-088686 A2	05/08/2010
		WO 2010-088686 A3	25/11/2010
US 2011-0019337 A1	27/01/2011	US 8317882 B2	27/11/2012
JP 2012-033899 A	16/02/2012	US 2012-0002348 A1	05/01/2012
		US 2014-0230208 A1	21/08/2014
		US 8749953 B2	10/06/2014
		US 9275798 B2	01/03/2016
KR 10-1222873 B1	25/01/2013	WO 2013-100493 A1	04/07/2013