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- (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, 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, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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.
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(54) **Title:** MONITORING ELECTROLYTE CONCENTRATIONS IN REDOX FLOW BATTERY SYSTEMS

(57) **Abstract:** Methods, systems and structures for monitoring, managing electrolyte concentrations in redox flow batteries are provided by introducing a first quantity of a liquid electrolyte into a first chamber of a test cell and introducing a second quantity of the liquid electrolyte into a second chamber of the test cell. The method further provides for measuring a voltage of the test cell, measuring an elapsed time from the test cell reaching a first voltage until the test cell reaches a second voltage; and determining a degree of imbalance of the liquid electrolyte based on the elapsed time.



A. CLASSIFICATION OF SUBJECT MATTER***H01M 8/18(2006.01)i, H01M 8/04(2006.01)i, H01M 8/02(2006.01)i***

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)

H01M 8/18; H01M 8/04; G01N 27/42; H01M 10/48; H01M 2/38; G01R 19/165; G01N 27/416; G01R 31/36

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: redox, flow, battery, concentration, voltage, test cell, time.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2003-173812 A (SUMITOMO ELECTRIC IND., LTD. et al.) 20 June 2003 See abstract, paragraphs [0014]-[0045], claims 1-4, figures 1-12.	1-26
Y	JP 2006-351346 A (KANSAI ELECTRIC POWER CO., INC. et al.) 28 December 2006 See abstract, paragraphs [0011]-[0040], claims 1-4, figures 1-3.	1-26
A	JP 09-101286 A (KASHIMAKITA KYODO HATSUDEN KK.) 15 April 1997 See abstract, paragraphs [0007]-[0020], claims 1-8, figures 1-2.	1-26
A	US 2008-0193828 A1 (SAHU, SAROJ KUMAR) 14 August 2008 See abstract, paragraphs [0018]-[0026], claims 1, 43.	1-26
A	JP 2006-107988 A (KANSAI ELECTRIC POWER CO., INC.) 20 April 2006 See abstract, paragraphs [0041]-[0057], claim 1, figures 1-2.	1-26



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/US2012/031174

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