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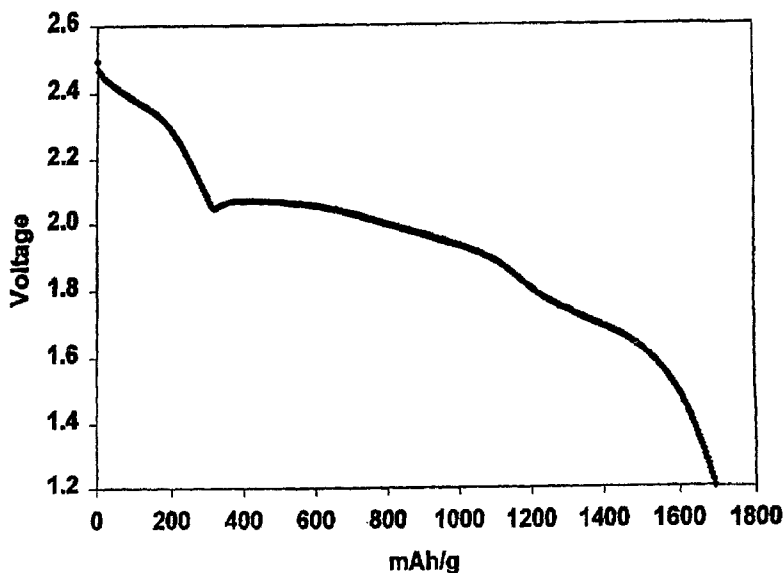
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Figure 2



(57) Abstract: Disclosed is a method of charging a lithium-sulfur electrochemical cell wherein the lithium-sulfur cell comprises a cathode comprising an electroactive sulfur-containing material, an anode comprising lithium, and a nonaqueous electrolyte. Also disclosed are methods for determining charge termination when charging lithium-sulfur cells.

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| <p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - H02J 7/04 (2008.04) USPC - 320/148 According to International Patent Classification (IPC) or to both national classification and IPC</p> | | | | | | | | | | | | | | | | | |
|---|---|--|-----------|--|-----------------------|---------------|---|--|---|--|-----------------|---|---|--|--|---|---|
| <p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) USPC : 320/148</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC : 429/156; 429/163, 429/326, 429/329, 429/334, 429/335, 429/337, 429/341</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWEST(USPT,PGPB,EPAB,JPAB); DialogPRO(Engineering); Google Scholar Search Terms: lithium, sulfur, battery/cell, charging, discharge, nitrate, nitrite, additive, electrolyte, anode, cathode</p> | | | | | | | | | | | | | | | | | |
| <p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X --- Y</td> <td>US 2005/0156575 A1 (Mikhaylik) 21 Jul 2005 (21.07.2005), entire document especially Abstract para [0005], [0021], [0027], [0044]-[0045], [0050], [0054], [0055], [0073], [0076], [0080], [0081], [0090], [0100]</td> <td>1-3, 5-20, 38-40 and 42-58 ----- 4, 21-37 and 41</td> </tr> <tr> <td>Y</td> <td>US 6,329,789 B1 (Gavrilov et al.) 11 Dec 2001 (11.12.2001), entire document especially Abstract and col 10, ln 40-50</td> <td>4, 21-37 and 41</td> </tr> </tbody> </table> <p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p> <table border="0" style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> <p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width:50%; vertical-align: top;"> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p> </td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"> Date of the actual completion of the international search 25 August 2008 (25.08.2008) </td> <td style="width:50%;"> Date of mailing of the international search report <p align="center" style="font-size: 1.2em;">05 SEP 2008</p> </td> </tr> <tr> <td> Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201 </td> <td> Authorized officer: <p align="right">Lee W. Young</p> <p align="left" style="font-size: 0.8em;">PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p> </td> </tr> </table> | | | Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. | X --- Y | US 2005/0156575 A1 (Mikhaylik) 21 Jul 2005 (21.07.2005), entire document especially Abstract para [0005], [0021], [0027], [0044]-[0045], [0050], [0054], [0055], [0073], [0076], [0080], [0081], [0090], [0100] | 1-3, 5-20, 38-40 and 42-58 ----- 4, 21-37 and 41 | Y | US 6,329,789 B1 (Gavrilov et al.) 11 Dec 2001 (11.12.2001), entire document especially Abstract and col 10, ln 40-50 | 4, 21-37 and 41 | <p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> | <p>"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</p> <p>"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</p> <p>"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</p> <p>"&" document member of the same patent family</p> | Date of the actual completion of the international search 25 August 2008 (25.08.2008) | Date of mailing of the international search report <p align="center" style="font-size: 1.2em;">05 SEP 2008</p> | Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. 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