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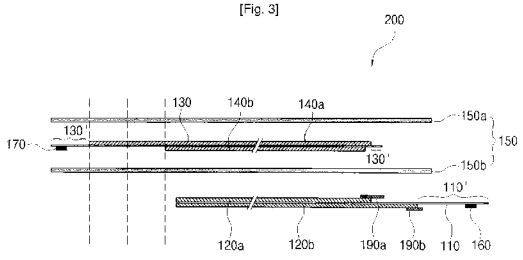
— *with international search report (Art. 21(3))*

— *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))*

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(54) **Title**: BATTERY HAVING ENHANCED ELECTRICAL INSULATION CAPABILITY

[Fig. 3]




(57) **Abstract**: Disclosed is a battery including a cathode and an anode wound to face each other with a separator interposed therebetween. Both surfaces of a cathode collector are provided with cathode active-material coating layers so as not to provide a cathode uncoated part at a winding beginning portion of the cathode. The cathode uncoated part for installation of a cathode lead is provided only at a winding ending portion of the cathode. An insulator tape is attached to the boundary of the cathode active-material coating layer facing the anode at the winding ending portion of the cathode. Providing the insulator tape to the boundary of the cathode active-material coating layer at a position where a non-coating part not containing the cathode active-material coating layer and an anode active-material coating layer face each other achieves enhanced electrical insulation capability and consequential safety of the battery.

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**INTERNATIONAL SEARCH REPORT**

International application No.
**PCT/KR2009/000947**

**A. CLASSIFICATION OF SUBJECT MATTER**

***H01M 10/02(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)

IPC H01M 10/02

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

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

eKOMPASS (KIPO internal) "lithium secondary battery & winding &insulation tape & jelly roll & prismatic and similar tems "

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | KR 10-2007-0096882 A(HITACHI MAXELL, LTD.) 02.OCT.2007<br>See the abstract, fig. 1 ~ 3, Paragraph <0017> ~ <0077>, whole claims | 1-19 |
| Y | KR 10-2006-0118955 A(SAMSUNG SDI CO., LTD.) 24.NOV.2006<br>See the abstract, fig. 1a ~ 4 Paragraph <0029> ~ <0084>, whole claims | 1-19 |
| A | JP 2004-259625 A(SANYO ELECTRIC CO., LTD.)16.SEP.2004<br>See the whole document | 1-19 |

☐ 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
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"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
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| Name and mailing address of the ISA/KR<br>Korean Intellectual Property Office<br>Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea<br>Facsimile No. 82-42-472-7140 | Authorized officer<br>JO Soo Ik<br>Telephone No. 82-42-481-5893 |

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Information on patent family members

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| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| KR 10-2007-0096882 A | 02.10.2007 | JP 04-183715 B2 | 12.09.2008 |
| | | JP 2007-258050 A | 04.10.2007 |
| | | US 2007-0224493 A1 | 27.09.2007 |
| KR 10-2006-0118955 A | 24.11.2006 | EP 1724857 A1 | 22.11.2006 |
| | | EP 1724857 B1 | 23.07.2008 |
| | | JP 2006-324239 A | 30.11.2006 |
| | | US 2006-0269835 A1 | 30.11.2006 |
| JP 2004-259625 A | 16.09.2004 | CN 100401573 C | 09.07.2008 |
| | | CN 1525591 A | 01.09.2004 |
| | | CN 1525591 C0 | 01.09.2004 |
| | | JP 04-201619 B2 | 17.10.2008 |
| | | KR 10-2004-0076831 A | 03.09.2004 |
| | | TW 233709 B | 01.06.2005 |
| | | TW 233709 A | 01.06.2005 |
| | | US 07258948 B2 | 21.08.2007 |
| | | US 2004-202928 A1 | 14.10.2004 |