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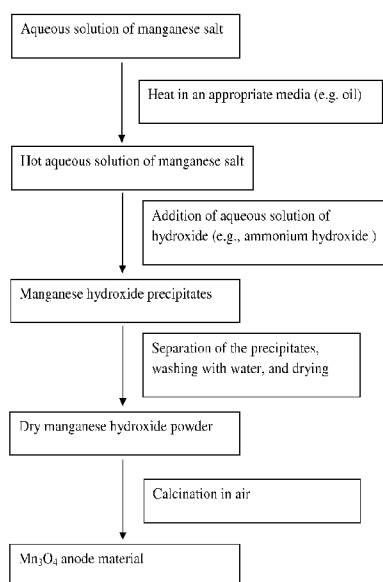


FIG. 1

(57) Abstract: Manganese oxide nanoparticles having a chemical composition that includes Mn_3O_4 , a sponge like morphology and a particle size from about 65 to about 95 nanometers may be formed by calcining a manganese hydroxide material at a temperature from about 200 to about 400 degrees centigrade for a time period from about 1 to about 20 hours in an oxygen containing environment. The particular manganese oxide nanoparticles with the foregoing physical features may be used within a battery component, and in particular an anode within a lithium battery to provide enhanced performance.



A. CLASSIFICATION OF SUBJECT MATTER*C01G 45/02(2006.01)i, C01D 15/00(2006.01)i, B82B 3/00(2006.01)i, B82Y 40/00(2011.01)n*

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)

C01G 45/02; C01F 5/00; C01D 1/02; C07C 2/66; H05B 3/10; C01G 45/12

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: nanoparticle, manganese oxide, sponge like morphology

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6960335 B1 (AMIT SINGHAL et al.) 01 November 2005 See abstract; claims 1, 10	1, 4, 7, 9, 12, 14, 15
X	WO 00-27754 A1 (NANOGRAM CORPORATION) 18 May 2000 See abstract; claims 1, 3, 20	1, 4, 7, 9, 12, 14, 15
X	US 2002-0122767 A1 (MICHIO TAKAHASHI) 05 September 2002 See abstract; paragraphs [0014-0029]	1, 4, 7, 9, 12, 14, 15
A	US 2010-0305378 A1 (GALLOWAY, JR. FREDERICK MERRILL et al.) 02 December 2010 See abstract; claims 1, 7, 8	1-23

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

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