

Title (en)

A METHOD OF PREPARING A LITHIUM IRON PHOSPHATE CATHODE MATERIAL FOR LITHIUM SECONDARY BATTERIES

Title (de)

VERFAHREN ZUM HERSTELLEN EINES LITHIUMEISENPHOSPHAT-KATHODENMATERIALS FÜR LITHIUM-SEKUNDÄRBATTERIEN

Title (fr)

PROCÉDÉ D'ÉLABORATION D'UN MATÉRIAU CATHODIQUE À BASE DE LITHIUM, DE FER ET DE PHOSPHATE POUR DES BATTERIES SECONDAIRES AU LITHIUM

Publication

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Application

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Priority

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Abstract (en)

[origin: WO2009117871A1] Described is a method of preparing a cathode material for lithium secondary batteries, the method comprising the following steps: sintering a first mixture containing a lithium compound, an iron compound, a phosphorous compound and a carbon additive at a first temperature, to obtain a first sintering product; mixing the first sintering product and a carbon additive, to obtain a second mixture; and sintering the second mixture at a second temperature, to obtain the cathode material. The cathode material so produced exhibits superior electrical properties.

IPC 8 full level

**H01M 4/58** (2010.01); **C01B 25/45** (2006.01); **H01M 4/136** (2010.01); **H01M 4/36** (2006.01); **H01M 4/62** (2006.01); **H01M 4/1397** (2010.01); **H01M 10/0525** (2010.01); **H01M 10/36** (2010.01)

CPC (source: EP)

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Citation (search report)

- [XI] CHEN AND J R DAHN Z: "Reducing Carbon in LiFeP04/C Composite Electrodes to Maximize Specific Energy, Volumetric Energy, and Tap Density", JOURNAL OF THE ELECTROCHEMICAL SOCIETY, ECS, vol. 149, no. 9, 29 July 2002 (2002-07-29), pages 1184 - 1189, XP008138292, ISSN: 0013-4651
- [A] DOEFF M M ET AL: "Optimization of carbon coatings on LiFePO4", JOURNAL OF POWER SOURCES, ELSEVIER SA, CH, vol. 163, no. 1, 7 December 2006 (2006-12-07), pages 180 - 184, XP027938446, ISSN: 0378-7753, [retrieved on 20061207]
- [A] LIU H P ET AL: "Synthesis and electrochemical properties of olivine LiFePO4 prepared by a carbothermal reduction method", JOURNAL OF POWER SOURCES, ELSEVIER SA, CH, vol. 184, no. 2, 8 March 2008 (2008-03-08), pages 469 - 472, XP024525240, ISSN: 0378-7753, [retrieved on 20080308], DOI: 10.1016/J.JPOWSOUR.2008.02.084
- [T] LAI C ET AL: "Improved electrochemical performance of LiFePO4/C for lithium-ion batteries with two kinds of carbon sources", SOLID STATE IONICS, NORTH HOLLAND PUB. COMPANY. AMSTERDAM; NL, NL, vol. 179, no. 27-32, 30 September 2008 (2008-09-30), pages 1736 - 1739, XP023521373, ISSN: 0167-2738, [retrieved on 20080522], DOI: 10.1016/J.SSI.2008.03.042
- See references of WO 2009117871A1

Citation (examination)

- CN 1457111 A 20031119 - HUANG HUIYANG [CN]
- CHUNSHENG WANG ET AL: "Ionic/Electronic Conducting Characteristics of LiFePO<sub>4</sub> Cathode Materials", ELECTROCHEMICAL AND SOLID-STATE LETTERS, vol. 10, no. 3, 1 January 2007 (2007-01-01), pages A65, XP055172733, ISSN: 1099-0062, DOI: 10.1149/1.2409768
- NAKAMURA T ET AL: "Electrochemical study on Mn<sub>2+</sub>-substitution in LiFePO<sub>4</sub> olivine compound", JOURNAL OF POWER SOURCES, ELSEVIER SA, CH, vol. 174, no. 2, 6 December 2007 (2007-12-06), pages 435 - 441, XP025917578, ISSN: 0378-7753, [retrieved on 20071206], DOI: 10.1016/J.JPOWSOUR.2007.06.191
- JAYAPRAKASH ET AL: "On the electrochemical behavior of LiMXFe<sub>1-X</sub>PO<sub>4</sub> [M=Cu, Sn; X=0.02] anodes - An approach to enhance the anode performance of LiFePO<sub>4</sub> material", ELECTROCHEMISTRY COMMUNICATIONS, ELSEVIER, AMSTERDAM, NL, vol. 9, no. 4, 1 April 2007 (2007-04-01), pages 620 - 628, XP022015804, ISSN: 1388-2481, DOI: 10.1016/J.ELECOM.2006.10.040
- CHUNG-YAN LAI ET AL: "Effect of Co doping on structure and electrochemical performance of LiFePO<sub>4</sub>", DIANCHI - BATTERY MONTHLY, vol. 37, no. 5, 1 October 2007 (2007-10-01), CN, pages 342 - 344, XP055050317, ISSN: 1001-1579
- YING J ET AL: "Preparation and characterization of high-density spherical Li<sub>0.97</sub>Cr<sub>0.01</sub>FePO<sub>4</sub>/C cathode material for lithium ion batteries", JOURNAL OF POWER SOURCES, ELSEVIER SA, CH, vol. 158, no. 1, 14 July 2006 (2006-07-14), pages 543 - 549, XP027938981, ISSN: 0378-7753, [retrieved on 20060714]
- LIU H ET AL: "Effects of heteroatoms on doped LiFePO<sub>4</sub>/C composites", JOURNAL OF SOLID STATE ELECTROCHEMISTRY ; CURRENT RESEARCH AND DEVELOPMENT IN SCIENCE AND TECHNOLOGY, SPRINGER, BERLIN, DE, vol. 12, no. 7-8, 18 December 2007 (2007-12-18), pages 1017 - 1020, XP019593244, ISSN: 1433-0768
- ZHANG M ET AL: "The preparation and characterization of olivine LiFePO<sub>4</sub>/C doped with MoO<sub>3</sub> by a solution method", SOLID STATE IONICS, NORTH HOLLAND PUB. COMPANY. AMSTERDAM; NL, NL, vol. 177, no. 37-38, 1 December 2006 (2006-12-01), pages 3309 - 3314, XP027896088, ISSN: 0167-2738, [retrieved on 20061201]

Cited by

CN109019547A; CN112390241A; CN112875671A; CN107792840A; CN112490439A; CN112599767A

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