

Accepted Manuscript

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PII: S0925-8388(18)32750-6

DOI: [10.1016/j.jallcom.2018.07.249](https://doi.org/10.1016/j.jallcom.2018.07.249)

Reference: JALCOM 46965

To appear in: *Journal of Alloys and Compounds*

Received Date: 26 April 2018

Revised Date: 19 July 2018

Accepted Date: 22 July 2018

Please cite this article as: X.-H. Ma, F. Zhang, Y.-Y. Wei, J.-H. Zhou, J. Wang, W. Jia, Z.-F. Zi, J.-M. Dai, Facile synthesis of amorphous FeVO₄ nanoparticles as novel cathode materials for sodium-ion batteries, *Journal of Alloys and Compounds* (2018), doi: [10.1016/j.jallcom.2018.07.249](https://doi.org/10.1016/j.jallcom.2018.07.249).

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Facile synthesis of amorphous FeVO₄ nanoparticles as novel cathode materials for sodium-ion batteries

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ABSTRACT:

The FeVO₄ nanoparticles are synthesized by a new and facile electrostatic spray assisted coprecipitation method. The effects of calcination temperature and crystal structure on electrochemical properties are discussed. X-ray diffraction, thermogravimetric analysis, scanning electron microscopy, transmission electron microscopy, nitrogen adsorption-desorption isotherms and galvanostatic cell cycling are used to characterize the structure and electrochemical performance of the FeVO₄ nanoparticles. Compare to the crystalline FeVO₄, the amorphous contemporary prepared by a low-temperature thermal treatment exhibits an outstanding electrochemical performance, which deliver a high initial coulombic efficiency of 80.4 %, stable cycling performance with a reversible capacity of 115.6 mAh g⁻¹ after 100 cycles and high rate capacity of 89.7 mAh g⁻¹ at 800 mA g⁻¹.

Keywords: FeVO₄; Amorphous; Cathode; Sodium-ion batteries

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