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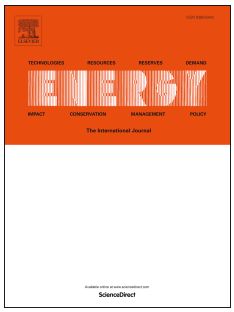

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PII: S0360-5442(18)31806-1

DOI: 10.1016/j.energy.2018.09.046

Reference: EGY 13740

To appear in: *Energy*

Received Date: 5 March 2018

Revised Date: 5 July 2018

Accepted Date: 6 September 2018

Please cite this article as: Wang M, Huang Y, Wang K, Zhu Y, Zhang N, Zhang H, Li S, Feng Z, PVD synthesis of binder-free silicon and carbon coated 3D α-Fe_2O_3 nanorods hybrid films as high-capacity and long-life anode for flexible lithium-ion batteries, *Energy* (2018), doi: 10.1016/j.energy.2018.09.046.

PVD Synthesis of Binder-free Silicon and Carbon Coated 3D α-Fe_2O_3 Nanorods Hybrid Films as High-Capacity and Long-Life Anode for Flexible Lithium-ion Batteries

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Abstract

Flexible lithium-ion batteries are being given great attention as up-and-coming power source for the development of flexible and wearable electronic devices. In this work, a carbon and silicon coated 3D α-Fe_2O_3 nanorod arrays on carbon cloth composite was firstly designed by facile hydrothermal method and physical vapor deposition process. The as-prepared composite can be directly applied as flexible anode for Li-ion batteries without adding any binder and conducting materials. The electrochemical results show that the composite exhibits outstanding electrochemical lithium storage properties with high initial Coulombic Efficiency of 76% at 100mA·g^{-1} current density and a superior cycling performance that could maintain about 910mAh·g^{-1} after 500 cycles at a 500mA·g^{-1} current density, which is two to three times of commercial graphite anodes. This study offers a promising route to greatly enhance the electrochemical properties of metal oxides and provides

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