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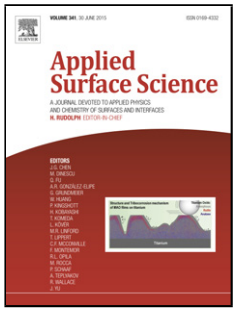

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Authors: Chang Wang, Hui Liu, Ming Jiang, Yingde Wang, Ruina Liu, Zhiping Luo, Xiaoqing Liu, Weilin Xu, Chuanxi Xiong, Dong Fang

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Ammonium vanadate@polypyrrole@manganese dioxide nanowire arrays with enhanced reversible lithium storage

Chang Wang[1], Hui Liu[2], Ming Jiang[1], Yingde Wang[3], Ruina Liu[1], Zhiping Luo[4], Xiaoqing Liu[5], Weilin Xu[1], Chuanxi Xiong[5], and Dong Fang*[1]

[1] *Key Lab of Green Processing and Functional Textiles of New Textile Materials Ministry of Education, College of Material Science and Engineering, Wuhan Textile University, Wuhan 430070, P. R. China*

[2] *School of Metallurgy and Environment, Central South University, Changsha 410083, P. R. China*

[3] *Science and Technology on Advanced Ceramic Fiber and Composites Laboratory, National University of Defense Technology, Changsha 410073, P. R. China*

[4] *Department of Chemistry and Physics, Fayetteville State University, Fayetteville, NC 28301, USA*

[5] *School of Materials Science and Engineering, Wuhan University of Technology, Wuhan 430070, P. R. China*

**Corresponding Author*

E-mail: csufangdong@gmail.com (*D. Fang*)

Highlights:

- An architectural design of a ternary ammonium vanadate ($NH_4V_4O_{10}$)-based electrode was proposed.
- The electrode structure and electrochemistry characters were examined based on experimental data.
- The capacity and the cycle-life were actually improved with PPy@MnO_2 core-shell-shell structure.

Abstract

Design and fabrication of novel optimized electrode materials is important for the development of new batteries for energy storage applications. Herein, we report on a hierarchical bulk electrode material with a tailored nanostructure that which consists of three components: a $NH_4V_4O_{10}$ nanowire as an active skeleton, an intermediate polymer layer (polypyrrole, PPy), and a metal oxide layer (MnO_2) as the outside shell. The $NH_4V_4O_{10}$-PPy-MnO_2 nanowires exhibit present higher capacitance than that of the simple $NH_4V_4O_{10}$-PPy core@shell or $NH_4V_4O_{10}$ nanowires. The structure of double shells of combined PPy and MnO_2 is a key factor in enhancing their electrochemical