Short Communication

Enhanced Lithium Storage Properties of Hierarchical MoS₂-rGO Nanosheets

Yuan Yuan¹, Feifan Huang², Anqing Pan^{1,*}, Wei Xiao^{2,*}

¹ School of Materials Science and Engineering, Central South University, Changsha 410083, PR China. Fax: +86 0731 8876692; Tel: +86 0731 88836069;

² School of Resource and Environmental Sciences, Wuhan University, Wuhan 430072, PR China. Fax: +86 27 68775799; Tel: +86 27 68775799;

*E-mail: pananqiang@csu.edu.cn, gabrielxiao@whu.edu.cn

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Layered materials (e.g. MoS₂ and graphene oxides) with ordered two-dimensional channels for mass transfer are promising building blocks for energy storage devices. Herein, hierarchical MoS₂-reduced graphene oxide nanosheets (notated as MoS₂-rGO nanosheets) are produced by growing hierarchical MoS₂ nanosheets on GO sheets through an L-Cysteine-assisted hydrothermal process together with a subsequent thermal annealing treatment. When evaluated as an anode material for lithium-ion batteries, the hierarchical MoS₂-rGO nanosheets manifest high specific capacity (~1000 mA h g⁻¹ at 100 mA g⁻¹), enhanced cycling stability and good rate capability. The present GO provides a robust and highly conductive matrix for in-situ growth of ultrathin MoS₂ nanosheets. The hence enhanced electrical conductivity, shorter mass transfer paths and structural integrity/robustness facilitates the enhanced lithium storage capability of the hybrids. The present work highlights the merit of hybrid two-dimensional materials for energy storage.

Keywords: hierarchical nanostructures; nanosheets; MoS₂; grapheme; lithium-ion batteries

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