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Vanadium nitride nanoparticles encapsulated in carbon sheets for stable high energy lithium ion anodes

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Uniform VN nanoparticles encapsulated in carbon sheets (VN@C) for a stable high energy lithium ion anode have been successfully synthesized by a facile solution combustion method combined with a thermal treatment at 600 ^{o}C under ammonia atmosphere. The as-synthesized VN@C sheets display high performance as an anode material for lithium ion batteries, including high reversible lithium storage capacity (640 mAhg-1 at 1 Ag-1 after 500 cycles), high Coulombic efficiency (~99%), excellent cycling stability and good rate capability due to their unique structure. VN nanoparticles encapsulated in conductive carbon sheets not only provide a large quantity of accessible active sites for lithium ion insertion/extraction along with good conductivity and short transport path for both electrons and lithium ions, but also can effectively circumvent the volume expansion/contraction associated with lithium insertion/extraction. In addition, the approach reported in this work is also applicable to other metal nitride nanoparticles encapsulated in carbon sheets, which may find important applications as electrodes, catalysts, adsorbents, and sensors in many disciplines.

Biography

Haoyang Wu is currently pursuing her Doctorate in Materials Science and Engineering at University of Science and Technology Beijing. Her research areas include research on preparation of vanadium based materials by low temperature combustion synthesis and their applications. She has published almost 6 papers in reputed journals..

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