Short Communication

Sn/C Composite as Anode Material for Lithium-Ion Batteries with Humic Acid as Carbon Source

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Sn/C anode materials were synthesized from SnO₂ particles with humics as carbon source for coating with a simple solid-phase-reduction strategy. XRD and SEM show that the materials consist of Sn and C, with Sn completely encapsulated by carbon. The carbon film can accommodate the volume expansion of Sn particles and considerably improve the electrical conductivity of the anode. The Sn/C anode materials have initial specific capacities of 1215 and 556 mAh·g⁻¹ in the first discharge and charge (100 mA·g⁻¹), respectively. The discharge capacity is 387 mAh·g⁻¹ after 50 cycles (coulombic efficiency = 98.2%). Electrochemical impedance spectroscopy (EIS) indicates that the Sn/C prepared from humics as carbon source has markedly improved charge-transfer kinetics compared with Sn/C-s anode (having sucrose as carbon source). Humics can be considered as a highly advantageous carbon source for coatings to enhance the electrochemical performance of Sn-based anode for lithium-ion batteries.

Keywords: Sn/C; Humics; Carbon coating; Anode; Lithium-ion battery

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