Short Communication

A Novel Binder-Free Sulfur/Polypyrrole Cathode for Lithium/Sulfur Batteries

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A novel type cathode for lithium/sulfur batteries is introduced based on polypyrrole nanowires on a Ni foil without any binder. Herein, a facile two-step approach is developed in this paper for the fabrication of novel three-dimensional nanoarchitectures of composite. Polypyrrole nanowires are directly synthesized on the Ni current collector. PPy on Ni foil is utilized as the flexible substrate for the infiltration of S *via* heat-treatment. The S/PPy binary composite electrode delivers a large reversible capacity of 1166 mAh g⁻¹ with appealing cycling stability (57 % capacity retained after 100 cycles). The electrochemical results show that PPy nanowire directly growing on the Ni foil current collector could offer both an electron-conductive path and a stable substrate for the sulfur electrode. Besides, PPy also has strong adhesion to the surface of Ni foil and absorbs polysulfides into its porous structure.

Keywords: Binder-free, Electropolymerized, sulfur/polypyrrole composite, sulfur cathode, lithium/sulfur battery.

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