Short Communication

Temperature Control in the Formation of Bimetallic Metal-doped Nanoporous Carbon as a Sulfur Host for Long-Life Lithium–Sulfur Batteries

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BMZIFs were synthesized by room-temperature reaction of a $\text{Zn}(\text{NO}_3)_2$ and $\text{Co}(\text{NO}_3)_2$ mixture solution and 2-methylimidazole. Furthermore, thermal treatment enabled improvement of the electrochemical properties of the materials. To investigate the optimum carbonization temperature for the BMZIFs, we conducted a thermal treatment experiment to explore the role of different temperatures. The sample morphology was characterized by scanning electron microscopy. Electrochemical characterization was examined by cyclic voltammetry and galvanostatic charge–discharge tests. Based on these electrochemical experiments, a sample treated at 900°C was found to show excellent electrical conductivity; the initial discharge capacity of a lithium–sulfur battery using Co,Zn-C-900@S as the electrode material was determined to be 1100.2 mAh/g at 0.1C. This shows that Co,Zn-C-900@S exhibits the best electrochemical performance characteristics.

Keywords: Lithium-sulfur battery; Metal–organic framework, Bimetallic ZIFs; MOF-derived porous carbon; Thermal Treatment

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