Study on the Combustion Products of Dimethyl Silicone Oil as Anode Materials for Lithium Ion Batteries

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For the first time, a novel finding, that the combustion products of dimethyl silicone oil can be used as the anode materials for lithium ion batteries (LIBs), was reported in this work. Namely, a proper amount of dimethyl silicone oil was burned at 800°C in a muffle furnace for 2 h, leading to the formation of two kinds of products, namely, white particles (sample a) and black particles (sample b). And then, sample a was thoroughly mixed with sample b at the mass ratio of 1:1 generating a new kind of material (sample c). All prepared samples were respectively characterized by XRD, SEM and XPS. No typical diffraction peaks were found in all resultant XRD patterns which strongly indicated that all prepared samples were amorphous in nature. SEM images revealed that many large spherical particles were prepared in sample a, and sample b contained many irregular large blocky particles. The results of galvanostatic charge and discharge experiments indicated that the initial discharge capacities of sample a, b and c at 100 mA g⁻¹ were 43, 41 and 68 mAh g⁻¹, respectively. Interestingly, after 50 cycles, the discharge capacities at 100 mA g⁻¹ of sample a, b and c were 30, 48 and 44 mAh g⁻¹, respectively. Summarily, a novel way, i.e., burning the Si-contained organic substances to prepare anode materials for LIBs, was developed in this work, which was very meaningful to the development of LIBs anode materials.

Keywords: dimethyl silicone oil; burning; anode materials; lithium ions battery

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