Short Communication

Simple Preparation of Co_3O_4 with a Controlled Shape and Excellent Lithium Storage Performance

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Co_3O_4 and $\text{Co}(\text{OH})_2$ precursors with spherical and a coexisting sheet-spherical morphologies were efficiently prepared using room-temperature deposition combined with calcination. Compared with spherical Co_3O_4 , coexisting sheet-spherical Co_3O_4 has better crystallinity and outstanding lithium storage performance. The first discharge capacity reaches 1089 mAh g^{-1} . The charging capacity is 604 mAh g^{-1} , demonstrating a 50-cycle capacity retention of 70%. The enhanced lithium-ion storage capacity is attributed to the two-dimensional structure of the coexisting sheet and spherical morphology contained in the sheet material; additionally, the surface has a large surface area. Thus, the coexisting sheet-spherical morphology can alleviate the volume expansion caused by lithium-ion insertion, while retaining a high capacity and good cycling performance.

Keywords: Co_3O_4 , Sheet and spherical, Two-dimensional, Lithium ion battery

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