

Synthesis of $\text{ZnIn}_2\text{S}_4/\text{C}$ nanocomposites and their applications

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Lithium ion batteries(LIB) are efficacious electrochemical energy storage device due to their high energy density, long life cycle, and no memory effect. Graphite is the most commonly used anode for LIB because of its stability and low volume expansion. However, graphite has critical disadvantage, low theoretical capacity. To overcome this limitation, the development of high-capacity anode material is indispensable.

Zinc Indium Sulfide (ZnIn_2S_4) is one of chalcogenide materials. When zinc indium sulfide with 2D layered structure act as a anode material in LIB, it shows interesting feature. In_2S_3 has a layered structure with proven high theoretical capacity and ZnS has reversible lithium insertion/desertion with good stability. From these features, ZnIn_2S_4 could be a good anode material for LIB. Also, carbon-based materials have been widely introduced due to its excellent conductivity. To enhance electrical conductivity, carbon is integrated with ZnIn_2S_4 nano structure.

In this work, $\text{ZnIn}_2\text{S}_4/\text{C}$ nanocomposites are synthesized with KIT-6 as a hard template and tested as anode materials. We anticipate that this material may show good cycle ability, stability, and high rate performance.