Cu_2Sb-P-C composite anodes for lithium-ion batteries

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Li-ion batteries (LIBs) is one of the most promising energy storage system because of its high initial efficiency and outstanding capacity retention. However, LIBs used graphite as anode has a limited theoretical capacity of 372mAh g^{-1}. Therefore, new materials have been investigated to realize high capacity and better electrochemical performance than graphite. Lithium can alloy with a variety of metallic elements such as Sb (660 mA h g^{-1}), Sn (847 mA h g^{-1}), and Ge (1108 mA h g^{-1}). Unfortunately, these materials suffer from enormous volume changes of 200%, 260%, and 370%, respectively during cycling, resulting in cracking and pulverization from the current collector. To overcome this drawback, we introduce active-inactive system. Phosphorus and antimony that react with lithium have a high theoretical capacity of 2596 mAh g^{-1} and 660 mAh g^{-1}, while inactive elements reduce volume change as electrochemically inactive matrix during cycling. In this presentation, the synthesis and electrochemical performance of Cu2Sb-P-C anodes for LIBs is discussed.