Short Communication

Effect of Lateral Dimension of Natural Graphite on Fabrication of Three-Dimensional Graphene Aerogels for High-performance Li-metal anodes

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Lithium metal, regarded as one of the most potential anodes for future battery systems, has attracted much attention for a long time. Nonetheless, uncontrollable Li dendrites growth and almost infinite volume change hinder the reliable implementation of lithium anode. Three-Dimensional graphene aerogel is an ideal lithium metal host material because of its abundant porous structure and large surface area, which can relieve the volume change, as well as reduce the effective current density. The lateral dimension of raw material natural graphite will affect the morphology and hierarchical structures of graphene aerogels, thereby affecting the electrochemical properties as a lithium host material. A series of graphene aerogels were prepared from natural graphite with different lateral dimensions (3.4 μm 、11 μm 、44 μm 、178 μm) for Li host material. The GA-11/Li composite anode exhibits the best electrochemical performance. The symmetrical cell with GA-11/Li electrode shows stable cycling for 600 h at 2 mA cm^{-2} for 2 mAh cm^{-2} . Surprisingly, the Li-S full cell with GA-11/Li anode delivers a high initial specific discharge capacity of 9.38 mAh cm^{-2} and stable cycle stability.

Keywords: Lithium metal anode, graphene aerogel, different lateral dimensions, cycling stability

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