

Metal oxide inserted bio-derived honeycomb like carbon foam for lithium ion battery anode

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Recently, the metal oxide based electrodes are considered to be the best alternatives to the carbon based electrodes due to their high theoretical capacity in lithium ion battery (LIB) anode. However, the tremendous volume change of the electrode and poor electrical conductivity are the main drawbacks, which decreases the electrochemical performances. Herein, we have tried to reduce the volume changes and increase the conductivity by inserting metal oxides into honeycomb like carbon foam. For obtaining the metal oxides inserted honeycomb like carbon foam, the fresh onion was freeze dried and immersed in the metal salt solution for up to complete absorption occurred. After that the onion-metal salt was reacted with aqueous NH₄OH for 24 to 48h to complete the formation of metal hydroxides. The final nanocomposite was obtained by freeze drying of the onion-metal hydroxides and followed by calcination at 500 °C for 5h. Due to the buffer effect of onion cells for metal oxide, at LIB anode, the metal oxide/ honeycomb like carbon foam exhibited high specific capacity and excellent cycle stability.