

Facile preparation of carbon foam and applications to binder-free electrode for lithium-ion battery anode and adsorbent for CO<sub>2</sub>

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Recently, the porous carbon based materials have attracted much attention due to their potential applications such as sorbents, filters, catalysts and catalyst supports, electrodes, sensors, electrochemical double-layer capacitors, rechargeable lithium batteries, hydrogen storage systems, and many others. Herein, we synthesized the porous carbon foam by synthesis of agarose pellet by compression and followed by carbonization at high temperature. The effect of porosity on changing the compression and calcination temperature was thoroughly investigated. In order to improve the physical properties of the material, the carbon foam composite was further activated at 800, 900, and 1000 °C. The surface area analysis indicates that increasing porosity of the electrode by increasing activation temperature. Afterward, this carbon foam was sliced to become thin sheets and applied as a binder-free electrodes for lithium ion battery (LIB) and adsorbents for CO<sub>2</sub>. Due to increasing porous characteristics of the electrode at high activation temperature, the carbon foam activated at 1000 °C exhibited excellent performances in LIB anode as well as high adsorption capacity for adsorption of CO<sub>2</sub>.