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Preparation and lithium storage performance of C-GQDs/α-Fe_2O_3 nanocomposites

Yi-ting Chang, Tien-Hao Chang, Su-Jien Lin, Zhang Ya-ting, Zhang Kai-bo, LIU Guo-yang, REN Shao-zhaoJIA Kai-li and **QIU Jie-shan**
National Natural Science Foundation of China, China

Electrodeposition technology was used to prepare α-Fe_2O_3 sheet-shaped nanoflowers (DMF: water=2:1) with morphological structure controllable by adjusting the ratio of electrolyte solvent (DMF and water). Further, a C-GQDs/α-Fe_2O_3 composite was prepared by the secondary electrodeposition in which the coal-based graphene quantum dots(C-GQDs) were obtained from Taixi anthracite as electrolyte and α-Fe_2O_3 as a working electrode. The electrochemical performance of C-GQDs/α-Fe_2O_3 as anode materials for lithium-ion batteries was tested. The results exhibited that the capacity of the composite reached 1582.5 mAh/g at a current density of 1 A/g, and about 1320 mAh/g of reversible capacity remained after 110 cycles. In addition, the composite maintained a capacity of 1091 mAh/g at high current density (5 A/g). The excellent cycling stability and rate performance are attributed to synergistic effect of the good conductivity of C-GQDs and α-Fe_2O_3 unique nanostructure distribution. It lays a foundation for the practical application value of lithium ion battery anode technology.

isyating@163.com