Controllable synthesis and electrochemical performance of Fe₂O₃@ graphene foam composite as anode materials for sodium-ion batteries

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We designed and synthesized a new self-supporting composite with Fe₂O₃ nanorods and three-dimensional graphene foam (GF). Fe₂O₃ tightly combined with graphene foam can well maintain the microstructure of the electrode, and can effectively reduce the volume expansion problem and improve the cycle stability of the electrode. Graphene foam as a matrix material effectively improves the conductivity of the electrode material, providing a channel for rapid electron transfer. Fe₂O₃@GF shows better lithium storage performance than electrode materials calcined at 300°C and 500°C, and Fe₂O₃-400@GF calcined at 400°C shows good cycle stability and high-rate performance, with a retention capacity of 410 mAh·g⁻¹ at 2 A·g⁻¹.

Keywords: Fe₂O₃; Graphene foam; Anode material; Electrochemical performance; Sodium-ion batteries

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