

Green and Facile Synthesis of Porous Hierarchical Cr₂O₃/N-doped Carbon Composite with High Li-Ion Battery Anodic Performance

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A green and facile bio-template method was developed to synthesize porous hierarchical Cr₂O₃/N-doped carbon (denoted as Cr₂O₃/NC) composite using egg-shell membrane as template and carbon source. The as-prepared Cr₂O₃/NC composite is assembled from interwoven and coalesced porous microfibers. The microfibers are constructed by Cr₂O₃ nanoparticles uniformly encapsulated 1D porous N-doped carbon matrix. Importantly, the as-prepared Cr₂O₃/NC electrode shows a superior Li-ion battery anodic performance. Under a current density of 100 mA g⁻¹, the Cr₂O₃/NC sample has a specific discharge capacity of 640 mA h g⁻¹ after 100 cycles. Moreover, after 50 cycles at a high current density of 1000 mA g⁻¹, the sample exhibits a discharge capacity of 368 mA h g⁻¹. The outstanding Li-storage performance of the composite should be attributed to the stable porous hierarchical structure, large specific surface area and highly conductive N-doped carbon matrix.

Keywords: Hierarchical structure, Cr₂O₃/N-doped carbon composite, Bio-template method, Li-ion battery

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