

Three Dimensional Graphene/Co₃O₄ Films for Lithium-ion Battery Anodes

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We report the high-performance of anode materials for lithium-ion batteries based on a 3D heterostructured architecture consisting of Co₃O₄ nanoparticles deposited on porous graphene surfaces. A combination of a replication and filtration process – a simple and general method – allows a direct assembly of 2D graphene sheets into 3D porous films with large surface area, porosity, and mechanical stability. Co₃O₄ nanoparticles with high energy storage capacity can be easily incorporated into the pore surfaces by a simple deposition strategy, and thus complete a 3D heterogeneous Co₃O₄/graphene film. Particularly, we exploit the 3D Co₃O₄/graphene composite films as anode materials of lithium ion batteries to resolve current issues of rate capability and cycling life. This unique 3D heterogeneous structure is capable of delivering excellent Li⁺ ion storage/release processes.