One-pot synthesis of Iron Oxide Nanobox Deposited on Hierarchically Porous Graphene Architecture for Lithium Ion Storage

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The hierarchical architecturing and hybridization of iron oxide is important for achieving multifunctional capability that makes it possible for practical applications. In particular, hierarchical architecturing of graphene/iron oxide hybrids in a three-dimensionally (3D) manner is expected to become an innovative chemical approach for full potential of respective functionality. In this study, hierarchically structured rGO/α-Fe_2O_3 nanobox hybrids (hrGO/α-Fe NBhs) are synthesized via a one-pot, hydrothermal self-assembly process. All in one synthetic approach is simple yet useful for simultaneously constructing 3D macroscopic rGO structures and growing α-Fe_2O_3 NBs. The discrete α- Fe_2O_3 NBs are uniformly distributed on the surface of the hrGO/α-Fe and confined in the 3D architecture, thereby inhibiting the restacking of rGO layers and maximizing their functionalities. In order to demonstrate the superiority of the hrGO/α-Fe NBhs, we applied them into lithium ion battery anodes.