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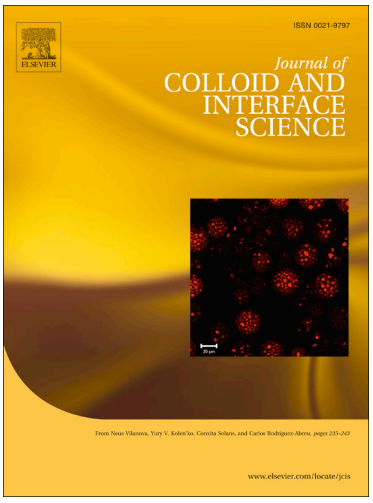

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Metal-organic framework-derived mesoporous octahedral copper oxide/titania composites for high-performance lithium-ion batteries

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Abstract

A mesoporous octahedral copper oxide@titania (CuO/TiO_2) composites with core-shelled structure have been successfully fabricated via a facile and cost-effective approach, which involves two main steps: the creation of homogeneous TiO_2 shell onto the octahedral Cu-based metal–organic frameworks (MOFs) template and thermal decomposition of the template at controlled temperature in the air. The design of combining CuO with the TiO_2 layer within a porous octahedra structure is beneficial to integrate the advantages of different components and address the severe volume change associated with pulverization issue that exists in most metal oxides-based electrodes. When assembled as an anode material for lithium-ion batteries, the as-fabricated mesoporous CuO/TiO_2 octahedra can achieve outstanding electrochemical performance in terms of a high reversible capacity (692 mAh g^{-1} at 100 mA g^{-1} for over 200 cycles) and exceptional rate capability (441 and 387 mA h