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A novel Mn₃O₄/MnO nano spherical transition metal compound prepared by vacuum direct current arc method as bi-functional catalyst for lithium-oxygen battery with excellent electrochemical performances

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Abstract

In this paper, a novel Mn₃O₄/MnO nano spherical transition metal compound as bi-functional catalyst for air electrode of lithium-oxygen battery is prepared by vacuum direct current arc method. Through physical property characterization, it shows that the Mn₃O₄/MnO particle size can be controlled between 40-60 nm and evenly distributed inside the carbon material. In addition, photoluminescence test result indicates that this material has better electronic conductivity and catalytic activity than traditional MnO₂ catalyst owing to some defects in the crystal structure. The cyclic voltammetry results display that the oxidation and reduction reactions are both very obvious even at high scanning rate, although only one kind of catalyst is employed in the air electrode. This proves that the Mn₃O₄/MnO nano spherical transition metal compound can be as a bi-functional catalytic material.

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