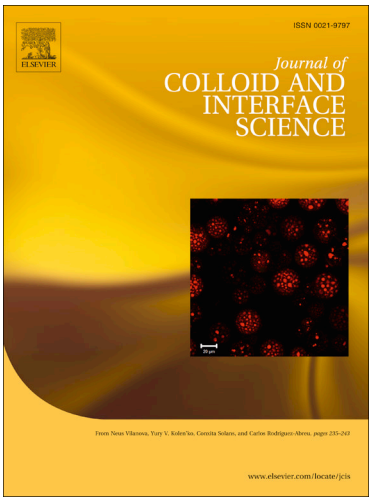

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Carbon-coated cobalt oxide porous spheres with improved kinetics and good structural stability for long-life lithium-ion batteries

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Abstract: Current anode materials for lithium-ion batteries (LIBs) mainly suffer from poor electronic conductivity and large volume expansion upon cycling. Improving kinetics and designing good morphology structural stability of electrode materials can effectively enhance the lithium storage performances of LIBs. In this study, we successfully synthesized hierarchical carbon-coated cobalt oxide (C@CoO) porous spheres with improved kinetics and good structural stability, which were investigated by *ex situ* electrochemical impedance spectrometry, scanning electron microscopy, and powder X-ray diffraction. We also optimized the preparation conditions of the C@CoO porous spheres. The C@CoO350 porous spheres exhibited good electrochemical performances including the high 2nd specific capacity of 811 mAh g^{-1} at 0.1 A g^{-1} and good rate property of 450 mAh g^{-1} at 4 A g^{-1}. Furthermore, it demonstrated an excellent cyclic stability with a high capacities of 669 mA h g^{-1} after 400 cycles at 0.5 A g^{-1}. Results demonstrated that C@CoO350 porous spheres are promising LIBs anodes.

Keywords: Cobalt oxide, Carbon coating, Improved kinetics, Structural stability, Lithium ion battery.

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