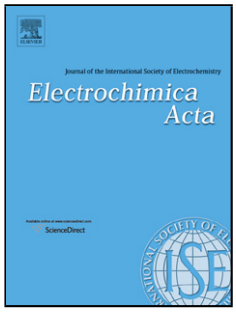

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Strongly coupled hybrid $ZnCo_2O_4$ quantum dots/reduced graphene oxide with high-performance lithium storage capability

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ABSTRACT: Mesoporous binary metal oxides/reduced graphene oxide (rGO) two-dimensional nanostructures can provide open large surface areas for lithium ion access and storage, holding a great promise as high-performance electrode materials for next-generation energy storage. In this work, we develop an effective strategy involving a simple polyol process and a facile thermal annealing treatment, to synthesize $ZnCo_2O_4$ Quantum Dots (QDs)/rGO hybrid. Due to the large specific surface area, strongly coupled interaction and synergic effect between $ZnCo_2O_4$ QDs and rGO, the hybrid shows excellent lithium storage ability, with high reversible specific capacity, and superior rate performance, as well as ultralong cycle life. After 100 cycles, the $ZnCo_2O_4$ QDs/rGO2 delivers a capacity of 1062 mAh g^{-1} at a current density of 500 mA g^{-1}. Even cycling at 2000 mA g^{-1} up to 1000 cycles, the reversible capacity still preserves 682.5 mAh g^{-1}. These electrochemical results indicate the $ZnCo_2O_4$ QDs/rGO2 hybrid could be a promising candidate material as a high-performance anode material for lithium-ion batteries.

Keywords: $ZnCo_2O_4$ quantum dots; reduced graphene oxide; anode materials; synergic effect; Li-ion battery