Magnesium Cobaltate Nanowires@manganese Dioxide Nanoflakes Core-Shell Arrays on Graphene-Decorated Nickel Foam for High-Performance Supercapacitors

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In this work, MgCo₂O₄ nanowires@manganese Dioxide nanoflakes core-shell arrays structure on graphene-decorated nickel foam were successfully prepared, which were featured by porous MnO₂ nanoflakes shell and one-dimensional MgCo₂O₄ nanowires core directly grown on the graphene. The morphologies of MgCo₂O₄ nanowires@manganese Dioxide nanoflakes core-shell arrays can be tuned by changing the hydrothermal reaction times. Due to the synergistic effect of graphene, MgCo₂O₄ nanowires, and MnO₂ nanoflakes, the optimized MgCo₂O₄ nanowires@manganese Dioxide nanoflakes core-shell arrays electrode materials exhibited excellent electrochemical performance such as high specific capacitances of 887.3 F g⁻¹ at a current density of 1 A g⁻¹ and good long-term cycling stability over 3000 cycles at a high current density of 10 A g⁻¹. The findings reported here clearly demonstrated that the core-shell arrays structure may be a promising candidate of high-performance electrode materials for supercapacitor.

Keywords: MgCo₂O₄; MnO₂; Core-shell arrays; Graphene; Supercapacitors

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