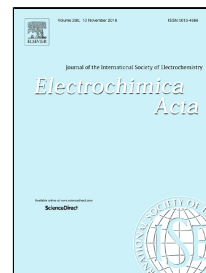


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Facile synthesis and electrochemical performance of Mg-substituted $\text{Ni}_{1-x}\text{Mg}_x\text{Co}_2\text{O}_4$ mesoporous nanoflakes for energy storage applications



Meenu Sharma, Shashank Sundriyal, Amrish K. Panwar, Anurag Gaur

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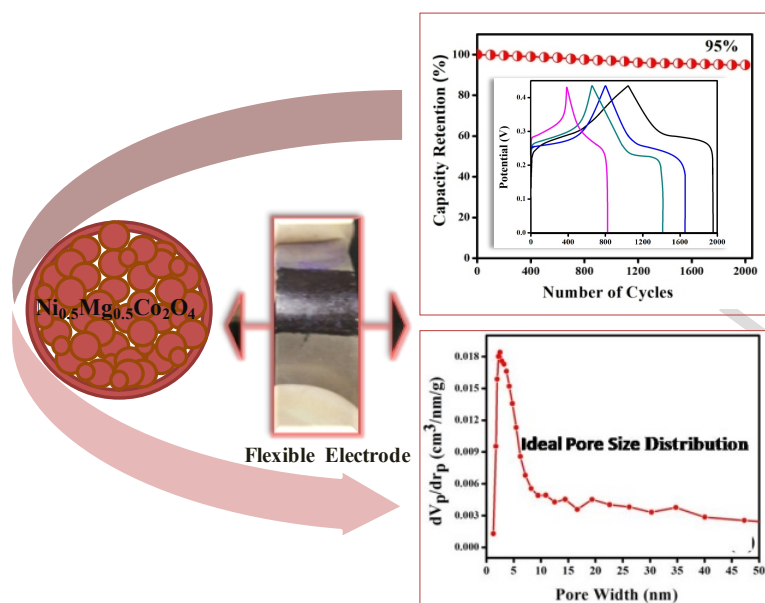
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GRAPHICAL ABSTRACT



ABSTRACT

The specific surface area and pore size of illustrative electrode material is a promising task to achieve better performance of energy storage devices. In this respect, Mg-substituted $\text{Ni}_{1-x}\text{Mg}_x\text{Co}_2\text{O}_4$ ($x=0.0, 0.1, 0.2, 0.3, 0.4, 0.5$) samples were synthesized by cost-effective and facile hydrothermal method. As-prepared samples were evaluated as the electrode material for a battery application. The structural and electrochemical characterization analysis has been carried out systematically. Among different samples, NMC50 ($x=0.5$) exhibit highest BET surface area of $61 \text{ m}^2\text{g}^{-1}$ with a suitable pore volume of $0.3029 \text{ cm}^3\text{g}^{-1}$ and narrow pore size distribution of 2–10 nm. It is verified that the special features of the NMC50 including uniformity of the surface texture and porosity bring significant effect on the electrochemical performances. Consequently, the excellent specific capacity of 302 mAhg^{-1} is observed for NMC50 sample at a current density of 1.1 Ag^{-1} and a remarkable cyclic stability of $\sim 95\%$ is maintained over 2000 continuous charge-discharge cycles. The improved electrochemical performance of NMC50, undoubtedly makes it worth as an excellent electrode material for high-performance energy storage applications.

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