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Nanotubular Ni-supported graphene @ hierarchical NiCo-LDH with ultrahigh volumetric capacitance for supercapacitors

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Highlights

- The ntN-NG@NiCo-LDH film was fabricated through CVD combined the hydrothermal method.
- The NiCo-LDH grown on ntN-NG, with mass loading of 3.92 mg/cm², shows hierarchical nanosheets/nanoneedles structure.
- The ntN-NG@NiCo-LDH hybrid exhibits a record high volumetric capacitance and excellent cycling stability.

Abstract

The design of the electrode materials for supercapacitors with high volumetric utilization and excellent capacitance is in high demand. In this study, the three dimensional porous hierarchical nickel cobalt layered double hydroxides (NiCo-LDH) grown on the nanotubular Ni supported N-doped graphene (ntN-NG) matrix are fabricated via chemical vapor deposition process combined with hydrothermal method. The ntN-NG substrate with low void content, high specific surface area, appropriated pore size and a hydrophilic surface facilitates the

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