Design of rod-like NiCo_2O_4 with nanostructure derived from ZIF-67 as excellent material for supercapacitors

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MOF (metal-organic framework) is an ideal precursor for the synthesis of metal oxides owing to the high porosity and provision of redox sites. This study focused on the formation of NiCo_2O_4 rod-like nanostructure from Co-MOF by a simple hydrothermal method to overcome disadvantages of MOF such as low electrical conductivity and stability. Noticeably, NiCo_2O_4 with unique nanostructure could be obtained when the template removed after calcination. It was observed by SEM and TEM, the morphology of NiCo_2O_4 nanorods with a diameter was about 100 nm. Moreover, the morphology of Co_3O_4 , which converted from MOF after calcination at 350 °C was similar to hexahedron. The synthesized rod-like NiCo_2O_4 electrode delivered specific capacitance of 1376 F/g at a current density of 1 A/g, indicating the excellent charge transfer ability in 6 M KOH solution. Therefore, this study presents a hydrothermal method to prepare the electrode materials based on MOF for supercapacitors effectively.

Keywords: Hydrothermal method; Co-MOF; NiCo_2O_4 ; Rod-like; Supercapacitor

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