Influence of Electrolytic Conditions on the Preparation of NiOOH by Catalytic Electrolysis Method

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In this paper, we propose a new method for the preparation of spherical nickel oxyhydroxide (NiOOH) by a clean catalytic electrolysis process of spherical Ni(OH)₂ in alkaline solution. The influence of various parameters, such as kinds of catalysts, reaction temperature and electrolysis duration on electrolysis is studied and the catalytic electrolysis mechanism is discussed. The prepared NiOOH sample is characterized by X-ray diffraction, scanning electron microscope observation and electrochemical measurements. The experimental results show that the spherical β-NiOOH powder with high capacity is obtained by electrolysis process under the conditions of a temperature of 30-35 °C with addition of KMnO₄ for 4 h in 6-9 mol L⁻¹ NaOH solution. The obtained NiOOH electrodes have superior electrochemical performance than commercial MnO₂ electrodes under different current densities. The NiOOH electrode offers 273.6 mAh g⁻¹ specific capacity at 60 mA g⁻¹, which is about 20% higher than that of commercial MnO₂ electrode.

Keywords: Nickel oxyhydroxide; KMnO₄; Catalytic electrolysis; Ni(OH)₂

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