



## 论文摘要

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## 电沉积纳米晶体电催化电极的制备及性能

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**摘要:** 利用恒电流电沉积的方法从含有糖精, 温度为50~60℃, pH<3的瓦特槽中用直流和脉冲的方式制备纳米晶体镍、镍-钴合金电催化析氢电极. X衍射、扫描电镜(SEM)和能谱(EDS)分析结果表明: 此类金属(Ni)或合金(Ni-Co)表现出很强的(111)织构; 该晶体为纳米晶体, 其中含有少量硫; 由电沉积纳米晶体制备成的电极在1 mol·L<sup>-1</sup>硫酸中比常规的金属Ni或电沉积粗晶镍有较强的电催化活性、稳定性和耐蚀性.

**关键字:** 电沉积; 电催化; 电极; 纳米晶体

## Preparation of nanocrystalline electrocatalytic electrode for electrodeposition

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**Abstract:** Galvanostatic deposition is used to electrodeposit nickel and nickel-cobalt alloy from a Watts bath containing saccharin at 50~60℃, pH<3.5 and at the current density  $i > 5 \text{ A}\cdot\text{dm}^{-2}$  in D. C. or pulse plating conditions. When comparing intensities of the nickel and nickel-cobalt alloy deposits with the traditional nickel deposit, it can be concluded that the deposits have strong (111) fibre texture by XRD analysis. The results of the X ray and SEM and EDS (energy dispersive spectroscopy) analysis show that the crystal of nickel and nickel-cobalt alloy deposits are nanocrystalline whose grain size is less than 100 nm and whose deposits are found to contain a little sulphur impurity. The electrodes made by electrodeposited nickel or nickel-cobalt alloy can electrocatalyse hydrogen evolution in 1 mol·L<sup>-1</sup> H<sub>2</sub>SO<sub>4</sub>. They also show good stability and anti-corrosion in these solutions.

**Key words:** electrodeposited; electrocatalyse; electrode; nanocrystalline

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