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研究论文

Electrocatalytic Oxidation of Methanol and Ethanol by Carbon Ceramic Electrode Modified with Ni/Al LDH Nanoparticles

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摘要 A Ni/Al layered double hydroxide (LDH) nanoparticle modified carbon ceramic electrode (Ni/Al LDH/NMCC) was fabricated and used for the electrocatalytic oxidation of methanol and ethanol in alkaline media. Cyclic voltammetric (CV) studies showed that it gave a significantly higher activity for methanol and ethanol oxidation and can be used as an electrocatalytic anode for fuel cells. The kinetic parameters of the electron transfer coefficient (α) and number of electrons involved in the rate determining step (n_α) for the oxidation of methanol and ethanol were determined using CV. The anodic currents showed a linear dependence on the concentration of methanol and ethanol.

关键词： nickel aluminium layered double hydroxide modified carbon ceramic electrode electrocatalytic oxidation methanol ethanol

Abstract： A Ni/Al layered double hydroxide (LDH) nanoparticle modified carbon ceramic electrode (Ni/Al LDH/NMCC) was fabricated and used for the electrocatalytic oxidation of methanol and ethanol in alkaline media. Cyclic voltammetric (CV) studies showed that it gave a significantly higher activity for methanol and ethanol oxidation and can be used as an electrocatalytic anode for fuel cells. The kinetic parameters of the electron transfer coefficient (α) and number of electrons involved in the rate determining step (n_α) for the oxidation of methanol and ethanol were determined using CV. The anodic currents showed a linear dependence on the concentration of methanol and ethanol.

Keywords： nickel, aluminium, layered double hydroxide, modified carbon ceramic electrode, electrocatalytic oxidation, methanol, ethanol

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[6] Fig. 10. Pseudo-steady state polarization curves of the Ni/Al LDH/NMCC electrode obtained in 0.01 (1), 0.02 (2), 0.03 (3). 0.04 (4), 0.05 (5), 0.06 (6), 0.07 (7), and 0.08 (8) mol/L methanol (a), plots of i?1 against cm-1 at various potentials of 503.5 (1), 513.6 (2), 523.7 (3), 533.8 (4), 543.8 (5), 553.9 (6), 564 (7), and 574 (8) mV/Ag/AgCl (b), plot of the slopes (of curves in (b)) vs exp(-nFE/RT) (c), and plot of the Ln(intercepts) (of curves in (b)) vs applied potential (d).

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