عنوان مقاله:
Methanol oxidation on titanium supported nickel

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خلاصه مقاله:
Electrochemical oxidation of methanol on platinum and platinum-based catalysts has been extensively examined. It is well-known that nickel and some Ni-based materials exhibit attractive activity for the electrochemical oxidation of some organic molecules like methanol, ethanol, cyclohexanol, glucose and aspirin. The titanium is a hard metal. It is corrosion resistant, has a high mechanical strength, a reasonable cost, wide electrochemical potential windows and good stability. Because of its excellent properties, titanium has been applied as a substrate in order to prepare novel and stable electrocatalysts including the well-known DSA (RuO2– TiO2/Ti) electrode. All solutions were prepared with doubly distilled water. All electrochemical experiments were performed in a conventional three-electrode cell powered by an electrochemical system comprised of an Autolab PGSTAT30 potentiostat/galvanostat and FRA2 boards (Eco Chemie, Utrecht, The Netherlands). The system was run by a PC through FRA and GPES 4.9 software. The working electrode was the Ni/Ti the counter electrode was large Pt foils. Saturated calomel electrode (SCE) was used as the reference. In this work, the electroactivity of Ni/Ti catalyst for the methanol oxidation in alkaline solutions was accessed by electrochemical voltammetric techniques. Effect of methanol concentrations on CVs of Ni/Ti with the potential sweep rate of 10 mV/s was investigated and results are shown in Fig. 1. Methanol concentrations (CCH3OH) were changed from 0 to 0.5 M indicated by the lines a–d, respectively. The anodic currents increase with the CCH3OH at potentials higher than 0.37 V,revealing the electrocatalytic activity of the Ni/Ti for methanol oxidation. Conversely, cathodic currents corresponding to the reduction of NiOOH decrease with CCH3OH. In addition, the cathodic peak potentials shift to more positive with CCH3OH. This results from the consumption of NiOOH caused by the presence of methanol through reaction. As a conclusion the electrocatalytic activity of the Ni/Ti electrode for methanol oxidation was evaluated by electrochemical voltammograms, The Ni/Ti showed extremely higher currents and lower onset potentials of methanol oxidation than the pureNi.

کلمات کلیدی: