Electrocatalytic properties of Ti/Pt–IrO2 anode for oxygen evolution in PEM water electrolysis

A novel Pt–IrO2 electrocatalyst was prepared using the dip-coating/calcinations method on titanium substrates. Titanium electrodes coated with oxides were investigated for oxygen evolution. Experimental results showed that Ti/Pt–IrO2 electrode containing 30mol% Pt in the coating exhibited significantly higher electrocatalytic activity for oxygen evolution compared to Ti/IrO2 prepared by the same method, which is also supported by the electrochemical impedance data. Stability tests demonstrated Pt–IrO2 electrocatalyst had a service cycle of 10,000 times in 0.1M H2SO4 solution. And the anode surface had hardly discovered cracks and had compact structures, which contributed to stable nature of the electrode together with good conductivity and specific interaction between Pt and IrO2 formed during the calcination. Furthermore, the enhanced catalytic activity for O2 evolution at Ti/Pt–IrO2 electrode is preliminarily discussed using the Mott–Schottky analysis.

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