Graphene-Modified IrO₂-Ta₂O₅ Coated Titanium Anodes for the Application of Impressed Current Cathodic Protection

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IrO₂-Ta₂O₅ coated titanium anodes with different graphene contents (Ti/IrO₂-Ta₂O₅-G) were prepared by the thermal decomposition method. The microstructure and the composition were analyzed using the field-emission scanning electron microscope and the energy dispersive spectrometer, and the electrochemical properties were investigated by electrochemical tests including cyclic voltammetry, anode polarization and electrochemical impedance spectroscopy. Results show that The Ti/IrO₂-Ta₂O₅-G anode with 0.4g·L⁻¹ graphene content presents the best electrochemical performance. As compared with the traditional Ti/IrO₂-Ta₂O₅ anode, Ti/IrO₂-Ta₂O₅-G anodes display the rugged morphology with tiny cracks which can provide more active centers, increase the electrochemically active surface area and thus enhance the electrocatalytic activity for the oxygen evolution process.

Keywords: IrO₂-Ta₂O₅; graphene; titanium anode; electrocatalytic capability.

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