

Preparation and characterization of lead dioxide electrode using sol-gel and electrochemical coating in aqueous/non aqueous combined medium towards long term stability

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Different types of deposition of PbO₂ become intensive among researchers due to many factors that include less commercial availability and importantly its good resistance to corrosion, long lifetime, low cost, and high over potential for oxygen evolution in electrolysis. However, pure PbO₂ is easily deactivated due to the fouling of electrode deposited by organic contaminates. In order to improve the PbO₂ activity and long time stability, types of additives such as SnO₂, SbO₂, Ni, Co, Bi, surfactant and resins like PTFE and solvents like acetonitrile, and n-butanol etc. were used. The present study mainly focused on sol-gel and electrochemical coating in combination of aqueous and non-aqueous medium to improve the stability of the PbO₂ electrode. Optimum experimental conditions were determined for both techniques. The prepared electrodes were analyzed by scanning electron microscope (SEM) method, voltage/current curve (V-I) test, cyclic voltammetry (CV) experimental, electrode impedance test, and the electrochemical stability test.