Preparation and Nucleation Study of β -PbO₂-WC Composite Coating Electrode for Oxygen Evolution Reaction

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In this study, β -PbO₂-WC composite coatings were synthesized on a substrate using the electrodeposition method in an electrolyte containing Pb²⁺ and WC particles. The preparation process study shows that the β -PbO₂ bath containing WC particles becomes more stable for an ultrasonic dispersion time within 30 minutes. WC particles in the β -PbO₂ bath are positively charged, with anions being adsorbed onto the particles. Compared to the β -PbO₂ composite electrode, the oxygen evolution overpotentials for the β -PbO₂-WC electrode are decreased, which demonstrates an energy-saving effect. The nucleation behavior study shows that the co-deposition of WC particles into the layer has little effect on the crystal growth of β -PbO₂. The main process during the deposition time of 0~5 min were the nucleation of the β -PbO₂ grains, the adsorption of WC particles, growth of β -PbO₂ grains, and WC particles coated.

Keywords: WC; β -PbO₂; OER; nucleation

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