

Novel $(\text{Ir}_x\text{Sn}_y\text{Sb}_z)\text{O}_w$ Material as Catalyst for the Oxygen Evolution Reaction.

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ABSTRACT

The synthesis of a novel material of general composition $(\text{Ir}_x\text{Sn}_y\text{Sb}_z)\text{O}_w$ for use in solid polymer electrolyte water electrolyzers (SPEWE) was accomplished from the simultaneous synthesis of the electrocatalyst and the support by means of thermal decomposition of chlorides precursors H_2IrCl_6 , $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ and SbCl_3 in ethanol. Different H_2IrCl_6 proportions in the reaction mixture were tested to observe their effect on the amount and electrocatalytic activity of the material obtained. The electrochemical properties of the different syntheses were measured by using: cyclic voltammetry (CV), linear voltammetry (LV), rotating disk electrode (RDE), chronoamperometry (CA) and electrochemical impedance spectroscopy (EIS). Electrochemical tests were conducted using as support electrolyte H_2SO_4 0.5 M in a conventional three-electrode cell. A mechanical mixture of IrO_2 with Vulcan carbon and iridium oxide with antimony doped tin oxide were also tested respect to the oxygen evolution reaction to compare the properties of catalyst/support obtained. The results indicate that synthesized materials could represent a suitable candidate to be used as anode in SPWE to catalyze the oxygen evolution reaction (OER).

Keywords: Water Electrolysis, Electrocatalyst, Oxygen Evolution Reaction.

