Facile synthesis of Sn-Pd catalysts with high performances for ethanol electro-oxidation in alkaline medium

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Nanostructured materials present unique properties as electrocatalysts for various industrial needs such as electrochemical energy conversion and storage. Aiming to enhance the electrocatalytic properties of Pd towards the electrochemical oxidation of ethanol, we used the electrodeposited Sn dendrites as a sub-layer for Pd. We tested the resulting Sn-Pd electrocatalysts for ethanol oxidation reaction (EOR). It was obtained that different morphological characteristics of Sn contribute to and determine Pd electrochemical behavior in EOR. By varying the amount of Sn loading prepared in the potentiostatic regime and keeping constant Pd loading, a series of Sn-Pd electrocatalysts with various ratios of Sn and Pd were synthesized and among them, Sn0.6-Pd0.4 showed to be the most active and poisoning tolerant catalyst in EOR. It was pointed out that optimization of composition and morphology assures well synergy of Sn with Pd towards EOR and at the same time demonstrates the guide for the design of novel materials with specific properties. Therefore Sn-Pd catalysts have emerged as a suitable and promising anode material for direct alcohol fuel cells.

Keywords: tin; palladium; morphology; composition; electrooxidation.

References

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