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Short communication

The Influence of Potential Sweep Cycle Number on the Electrocatalytic Activity of the Boiled PdO/Graphene for Ethanol Oxidation Reaction (EOR)

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A suspension solution consisting of PdO and graphene was boiled at 200 ^{o}C for 2 h, and the filtered and dried samples were denoted as materials of PdO/G. Subsequently, the obtained samples were immobilized on a glassy carbon (GC) electrode, producing a PdO/G modified GC electrode. Lastly, the prepared electrodes were swept by a potentiostatic method at the scan rate of 10 mV s^{-1} in a solution having $PdCl_2$ and Na_2SO_4 for various cycles (0, 20, 50 and 80 cycles), yielding four kinds of PdO/G electrodes, being denoted as potential sweep cycle (PSC)-treated PdO/G electrodes. The morphologies of the scraped samples were mainly characterized by using Transmission electron microscopy (TEM). And the electrocatalytic abilities of the PSC-treated catalysts towards ethanol oxidation reaction (EOR) were basically examined by using cyclic voltammetry (CV) and chronoamperometry (CA). The electrochemical consequences indicated that the catalyst of PdO/G treated by 50 cycles (catalyst **c**) delivered the best electrocatalytic activity among all as-prepared catalysts. The smaller particle size and higher percentage of Pd were regarded as the main reasons for the excellent electrocatalytic activity of catalyst **c** towards EOR as compared to other catalysts. Showing the fact that the potential sweep cycle could be employed as a method to enhance the electrocatalytic activity of PdO/G materials was the main contribution of this short communication.

Keywords: PdO; graphene; boiling treatment; potential sweep cycle number; ethanol oxidation reaction; electrocatalysis

FULL TEXT