Enhanced Water Electrolysis: Effect of Temperature on the Oxygen Evolution Reaction at Cobalt Oxide Nanoparticles Modified Glassy Carbon Electrodes

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Water splitting producing hydrogen and oxygen gases appears promising in view of the increasing need of renewable energy sources and storage strategies. Investigation of stable and highly efficient electrocatalysts for oxygen evolution reaction (OER) is targeted in this study at cobalt oxide nanoparticle modified glassy carbon (nano-CoOx/GC) electrodes. The effect of the preparation (T_p) and measuring temperature (T_m) on the electrocatalytic activity of nano-CoOx/GC towards the OER is investigated under various operating conditions. Linear sweep voltammetry (LSV), cyclic voltammetry (CV) as well as SEM and XRD techniques were used to probe the electrocatalytic and morphological characteristics of nano-CoOx prepared under various conditions. Increasing T_p and/or T_m results in improving the kinetics and electrocatalytic activity of the proposed anodes towards the OER as demonstrated in the value of the onset potential of the OER and the OER currents recorded at a fixed potential. The morphology as well as the surface characterization of the prepared catalyst are reported herein and evaluated.

Keywords: Water splitting, Electrocatalysis, Hydrogen evolution, Nanoparticles, Oxygen evolution

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