

Temperature controlled Atomic Ir-cluster decorated Ni_{Core}@Pd_{Shell} nanocatalyst for oxygen reduction reaction in alkaline electrolyte

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Abstract

A wet chemical method was used to sequentially reduce nickel ions (Ni), palladium ions (Pd) and iridium ions (Ir) on acidified activated carbon to form Ni_{Core}@Pd_{Shell} structure with decorated iridium clusters, as electrocatalyst for alkaline fuel cell.

In this study, we investigate the effect of the adsorption temperature of Ni on AC to the performance of nanocatalyst for ORR in alkaline fuel cell. The result shows that a relatively high onset potential (0.901 V) and mass activity (1411.8 mA · mg⁻¹) were achieved with 1.2 wt% Ir decorated, The Ir decorated Ni@Pd nanocatalyst shows 21-fold improvement compared to the commend JM.Pt/C. Through the cross-reference of the results of physical structure inspection and electrochemical analysis, we found that increasing the absorption temperature for Ni can effectively enhance the performance of nanocatalyst for ORR.

Keywords: Nanocatalyst, Oxygen Reduction Reaction, Core Shell nanostructure, controlling chemisorption temperature