

Carbon supported PdCoP electrocatalyst for oxygen reduction reaction

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Proton exchange membrane fuel cells (PEMFCs) are attracting more and more attention as environmental-friendly power sources for transportation and stationary applications. Pt supported on carbon remains as an electrocatalyst widely used for the oxygen reduction reaction (ORR) due to its high catalytic activity and stability. However, the high cost and limited natural abundance of Pt pose serious challenges for the commercialization of the PEMFC technologies. On the other hand, Pd has a similar valence shell electronic configuration and lattice constant to platinum and is less expensive and relatively abundant compared to Pt. In this paper, we present a new heterogeneous Pd alloy catalyst, which is existed Pd, Co, and P in the single particles catalysts to greatly improve the catalytic activity of binary Pd alloy for the ORR by the modified polyol process. The high activity of the PdCoP catalyst can be attributed to smaller nanoparticle sizes by the phosphorus atom and changing the electron density of Pd by cobalt atom. This unique combination of Co, P with Pd could provide the direction of development of non-Pt catalyst for oxygen reduction reaction.