WO₃ Modified Graphene Supported Pt Electrocatalysts with Enhanced Performance for Oxygen Reduction Reaction

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To improve performance of Pt catalyst, the unique Pt/WO₃-G catalysts for oxygen reduction reaction (ORR) are prepared, in which WO₃ modified graphene (WO₃-G) is adopted as a carrier. According to XRD experiment results, Pt/WO₃-G catalysts are primarily composed of Pt nanoparticles, monoclinic WO₃ and graphene. The TEM and high resolution TEM analysis indicate that Pt/WO₃-G catalyst with the coexistence of Pt particles and WO₃ has narrower distribution of Pt particles with average particle size of 3.9 nm. As expected, The Pt/WO₃-G catalysts reveal better electrocatalytic activity with higher current densities, lower overpotential and faster kinetics process compared to the Pt/G catalyst. The enhancement of ORR activity on Pt/WO₃-G electrocatalyst is probably attributed to the synergistic effect between Pt and WO₃ nanoparticles. Specifically, the interaction between Pt and WO₃ can increase the dispersion of Pt nanoparticles, accelerate the protonation of the O₂ molecule and decrease the adsorption strength of oxygenated species.

Keywords: Oxygen Reduction Reaction; Graphene, Pt Electrocatalysts

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