

The Effects of the Size of Graphene Sheets as Support Material on Electrocatalytic Reactions

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Pt-deposited graphene catalysts are prepared over the reduced graphene oxide (RGO) sheets with different sizes. The size-selected graphene oxide (GO) sheets used as support material are synthesized by the modified Hummers method and subsequent pH-induced size fractionation procedure. Two prepared catalysts of Pt nanoparticles on the smaller RGO sheets (Pt/S-RGO) and larger RGO sheets (Pt/L-RGO) are applied for electrocatalytic reactions of methanol oxidation reaction (MOR) and oxygen reduction reaction (ORR) in acidic media. The Pt/S-RGO presented the higher MOR and ORR activities than the Pt/L-RGO, indicating that the performances of the catalysts could be influenced by the sheet size of graphene. Superior electrocatalytic performances of Pt/S-RGO might be attributed to the synergetic effects of the improved accessibility of reactants and dispersion of Pt nanoparticles caused by the small sized RGO sheets with higher surface area.