

One-pot, clean synthesis of high quality reduced graphene oxide and platinum hybrid nanomaterial

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Graphene/Platinum hybrid nanomaterials have numerous applications that include catalysts for hydrogenation of nitroarenes, electrocatalysts in Co-Bipyridine-Mediated Dye-Sensitized solar cells, gas sensors, and oxygen reduction in methanol fuel cells. We report a brand new, one-pot, clean method, well-dispersed Pt nanoparticles on reduced graphene oxide (RGO), high degree of reduction for the synthesis of high quality RGO/Pt hybrid nanomaterial at low temperature. High quality RGO/Pt hybrid was prepared by decorating Pt nanoparticle on graphene oxide sheets via hydrogen reduction of chloroplatinic acid, following by using Pt nanoparticles as catalyst for hydrogen dissociation to atomic hydrogen which served as strong reducing agent for effective reduction of graphene oxide. The C/O ratio of obtained RGO was as high as 22, one of the highest value ever reported. The Pt nanoparticles were almost decorated on the RGO sheets with the sizes on the range 2.2 to 5 nm. The electrical conductivity of RGO/Pt pellet was as high as at 8080 S/m, much greater than other RGOs prepared by chemical reduction method.