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Preparation, Characterization, and Catalytic Applications of Graphene–palladium Nanocomposites

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Modifications of graphenes have been studied for catalytic applications due to their advantages such as high surface area, conductivity and thermal stability. In this research, individual graphene oxide (GO) sheets were exfoliated from graphite using Hummers and Offeman method. Pd nano-particles were deposited on the GO surface using Pd²⁺ ion exchange where hydroxyl groups on the GO act as nucleation sites of Pd nanoparticles and their dispersions. The thermal treatments of the Pd-GO in H₂ flow produced Pd-Graphene nanocomposites. Their catalytic performances in Sonogashira reaction were investigated. Morphological and chemical structures of the GO, Pd-GO, and Pd-Graphene were investigated using FT-IR, XRD, TEM, STEM, and XPS. The catalytic performances have been investigated using microwave reactor.

Keywords: Graphene, Pd, XPS, IR, Sonogashira