

Synthesis, Characterization of Pd Nanoparticle Supported on Amine-Functionalized Graphene and Its Catalytic Activity for Suzuki Coupling Reaction

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Abstract : Synthesis of well distributed Pd nanoparticles (3 - 7 nm) on organo amine-functionalized graphene is reported, which demonstrated excellent catalytic activity towards Suzuki coupling reaction. The active material was characterized by X-ray diffraction (XRD), BET surface area, X-ray photoelectron spectra (XPS), Fourier-transfer infrared spectroscopy (FTIR), Raman spectra, Scanning electron microscope (SEM), Transmittance electron microscopy (TEM) analysis and HRTEM. FT-IR revealed that the organic amine functional group was successfully grafted onto the graphene oxide surface. The formation of palladium nanoparticles was confirmed by XPS, TEM and HRTEM techniques. The catalytic activity in the coupling reaction was superb with 100% conversion and 98 % yield and also activity remained almost unaltered up to six cycles. Typically, an extremely high turnover frequency of 185,078 h⁻¹ is observed in the C-C Suzuki coupling reaction using organo di-amine functionalized graphene as catalyst.

Keywords : Di-amine, graphene, Pd nanoparticle, suzuki coupling

Conference Title : ICGCE 2015 : International Conference on Green Chemistry and Environment

Conference Location : Zurich, Switzerland

Conference Dates : July 29-30, 2015