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Palladium nanoparticles supported on four different materials as efficient catalysts for Suzuki cross-coupling reactions

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Palladium-catalyzed carbon-carbon bond-forming reactions developed by Heck, Negishi and Suzuki, among others have made a critical impact on synthetic organic chemistry. In this regard, coupling reactions present wide applications in the production of polymers, agrochemicals, pharmaceutical intermediates, and high-tech materials. Palladium nanoparticles (Pd NPs) provide high activity in catalyzing Suzuki cross coupling reactions, due to their high surface to area ratio. Silica, activated carbon, carbon nanotubes and alumina are used as support materials for Pd NPs to provide heterogeneous catalysis for the reaction. Four different support materials have been used and their catalytic activities were investigated. Pd NPs were prepared by supercritical carbon dioxide deposition method and vic-dioxime derivative Palladium complexes were used as precursors. Supported Pd nanoparticles were characterized by X-ray diffraction (XRD), transmission electron microscopy (TEM) and scanning electron microscopy (SEM). XRD patterns showed that the size of nanoparticles changes between 2 and 10 nm.

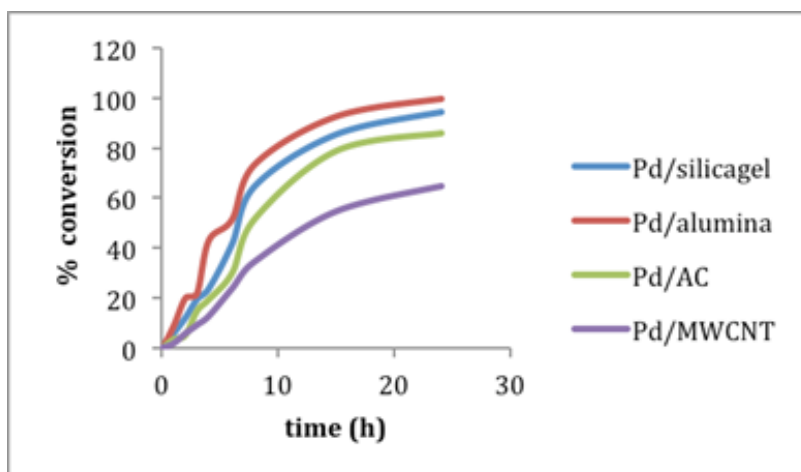


Figure 1. Suzuki-Miyaura cross-coupling reaction results of various Pd(0) nanoparticles (Pd NPs)

The catalytic activities of Pd NPs were performed in Suzuki-Miyaura cross-coupling reactions. The reactant/product ratio was determined with gas chromatography (GC) and almost %100 conversion was got from alumina supported Pd NPs.

Biography

Bilgehan Güzel has completed his PhD at Çukurova University and Postdoctoral studies from Texas A&M University. He has published more than 9 papers in reputed journals and his research areas are organometallic complexes, catalysts, nanomaterials and scCO_2 media.

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