

Efficient ligand-free Hiyama cross-coupling reaction catalyzed by functionalized SBA-15-supported Pd nanoparticles

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A ligand-free Hiyama cross-coupling reaction catalyzed by functionalized SBA-15-supported Pd catalysts has been developed. The catalysts were prepared by depositing Pd nanoparticles preferentially in the micropores of the SBA-15 with hydrophobic trimethylsilyl or triphenylsilyl groups grafted on the mesopores. The nanocomposite catalysts showed excellent activities for the cross-coupling between various aryltriethoxysilanes and aryl halides under relatively mild (at 100 °C in air) reaction conditions. Moreover, the hydrophobic functionalization rendered the catalysts reusable without showing significant activity loss. The decreased activity after successive catalytic runs was attributed to a low level of Pd-leaching and a gradual collapse of mesopores of host silica. The cross-coupling protocol with the designed catalysts would be practical for use as an economical synthetic method for the construction of biphenyl derivatives.

Keywords: Ligand-free Hiyama cross-coupling; palladium nanoparticles; functionalized SBA-15

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