

Jayamurugan, G.; Umesh, C. P.; Jayaraman, N., 2009, "Preparation and catalytic studies of palladium nanoparticles stabilized by dendritic phosphine ligand-functionalized silica", *J. Mol. Catal. A: Chem.*, 307, 142 – 148.

This manuscript concerns with the synthesis of dendritic phosphine functionalized silica and its palladium complex, followed by a study of the catalysis. The work specifically addresses the functionalization of phosphinated poly(ether imine) dendrimer onto silica, with the aim to study the heterogeneous catalysis mediated by the dendrimer functionalized solid support. In this effort, synthesis of a phosphinated first generation dendrimer and its covalent attachment to the solid support are accomplished. The dendritic moiety is not only a new ligand system for functionalizing a solid support, but also enables attachment of multiple number of catalytically active units at their peripheries. As a case study, the multiple number of phosphine groups, present at the peripheries of the dendrimer, were complexed with Pd(II). The complex was reduced further to obtain the metal nanoparticles. The functionalized silica-nanoparticle composite is characterized by microscopy and X-ray photoelectron spectroscopy, apart from solid state NMR spectroscopies. A hydrogenation study was conducted, by utilizing the composite, in order to assess the catalytic efficiencies. From these studies, the benefits of stabilizing the metal nanoparticle with the aid of the dendrimer functionalized silica are identified.