



## Anjali Patel

The Maharaja Sayajirao University of Baroda, India

### Stabilized heterogeneous *Palladium* nanoparticles: Designing and applications in some aqueous organic transformations

Pd based catalyst, especially Pd (0) nanoparticles, is very well known and fascinating for carrying out number of organic transformations. However, the major disadvantage is the formation of less active large aggregates as well as Pd-black, responsible for the deactivation of the catalyst. To prevent such problems, the challenge is to synthesize stable catalysts via using stabilizing agents. Number of various stabilizing agents such as  $(C_8H_{17})_4N^+Br^-$ , Poly (N-vinyl-2-pyrrolidone) (PVP), Hydroxyl-Terminated Poly (amido-amine) (PAMAM) dendrimers and natural organic extracts are used. Recently polyoxometalates are gaining attention as excellent stabilizing agents due to their number of convergent properties. The present work reveals a simple methodology for synthesizing the highly stabilized Pd (0) nanoparticles using supported 12-tungstophosphoric acid as a stabilizer as well as a carrier. The obtained nano-catalyst was characterized by different methods and the presence of nanoparticles on the surface of the carrier was confirmed, especially by XPS and HRTEM. As applications, the use of catalyst was explored for the well-known fascinating organic transformations, Suzuki–Miyaura (SM) and Heck cross coupling reactions in aqueous medium as well as hydrogenation (Cyclohexene, Croton Aldehyde and Nitrobenzene) in neat  $H_2O$ . It was found that the catalyst shows an outstanding activity for all reactions, for e.g., only 0.0096 mol % of Pd gives 99% conversion with TOF 96958  $h^{-1}$  for SM coupling. The catalyst was recovered by simple filtration, regenerated and reused without any significant

loss in conversion. Study shows that the present catalyst is truly heterogeneous and sustainable for the said reactions. The viability of the catalyst was learned towards variety of substrates and found to be excellent in almost all cases.

**Biography:** Dr. Anjali Patel, Prof. of Inorganic Chemistry, after receiving her Ph.D. in 1992, pursued Post-Doctoral studies at Institute de la recherche Sur la Catalyst, CNRS, Lyon, France during 1992-93 and currently is Head, Department of Chemistry, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. Her research interest focuses on Polyoxometalates, Heterogeneous Catalysis, Green Chemistry and Material Science. She has 117 papers in international journals including two review articles in Green Chemistry (RSC) and Catalysis Reviews Science and Engineering (Taylor and Francis), 3 patents, 5 book chapters and 2 books to her credit. She has visited various countries like USA, UK, China, France, Germany, Italy, Russia and Japan at various international conferences as invited speaker. Further, she has been awarded the prestigious Fellow of the Royal Society of Chemistry (FRSC) and a three year membership at the American Chemical Society (ACS).

[aupatelchem@gmail.com](mailto:aupatelchem@gmail.com)