

Pt and Pd Nanoparticles Entrapped in Titanate Nanotubes for Chemoselective Hydrogenation of Nitrobenzene

K. Shanmugaraj,¹ T.M. Bustamante,¹ G. Pecchi,¹ R.V. Mangalaraja,² C.C. Torres³ and C.H. Campos¹

¹Departamento de Físicoquímica, Facultad de Ciencias Químicas, Universidad de Concepción, Concepción, Chile. shanmugaraj.chemist@gmail.com

²Departamento de Ingeniería de Materiales, Universidad de Concepción, Concepción, Chile.

³Departamento de Ciencias Químicas, Facultad de Ciencias Exactas, Universidad Andres Bello, Sede Concepción, Talcahuano, Chile.

Presenter Name: **K. Shanmugaraj**

Abstract: Platinum and palladium nanoparticles encapsulated in the channel of titania nanotubes (TiO₂ NTs) were prepared by impregnation route. As prepared Pt@TiO₂ NTs and Pd@TiO₂ NTs were characterized by transmission electron microscopy (TEM), N₂ adsorption-desorption isotherms, X-ray diffraction (XRD), FT-IR and X-ray photoelectron spectroscopy (XPS) measurements. TEM and N₂ adsorption-desorption isotherms results demonstrated that Pt and PdNPs were confined into the channel of TiO₂ NTs. The catalytic performance of these materials was tested using nitrobenzene as model compound for the hydrogenation to anilines. Under the optimum experimental conditions, the nitrobenzene conversion and the selectivity for aniline were studied and the results were compared for both of these catalysts. A mechanism about the hydrogenation of nitroarenes catalyzed by Pt and Pd@TiO₂ NTs systems was proposed. To compare the selectivity of the prepared catalysts, all the substrate was hydrogenated using both metal-NPs supported on commercial TiO₂ carriers. These results are valuable to design novel efficient strategies for the selective hydrogenation of nitrocompounds.