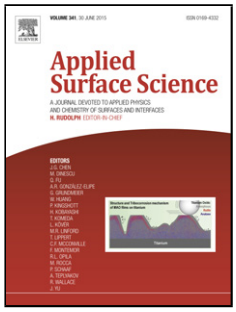

Title: Nickel-based xerogel catalysts: synthesis via fast sol-gel method and application in catalytic hydrogenation of *p*-nitrophenol to *p*-aminophenol

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Title: Nickel-based xerogel catalysts: synthesis via fast sol-gel method and application in catalytic hydrogenation of p-nitrophenol to paminophenol

Article Type: Full Length Article

Keywords: Ni-based xerogel catalysts; p-nitrophenol; hydrogenation; high selectivity; reutilization

Abstract: In order to investigate the roles of three-dimensional network structure and calcium on Ni catalysts, the Ni, Ni-Al_2O_3, Ni-Ca-Al_2O_3 xerogel catalysts were successfully synthesized via the fast sol-gel process and chemical reduction method. The crystal structure of three different catalysts was observed with X-ray powder diffraction (XRD). Transmission electron microscopy (TEM), scanning electron microscopy (SEM) and nitrogen adsorption-desorption were employed to investigate the role of network structure of xerogel catalysts and the size distribution of Ni nanoparticles. The catalyst composition was determined by inductively coupled plasma-optical emission spectrometry (ICP-OES) measurement and energy-dispersive X-ray spectroscopy (EDS). Temperature-programmed reduction (TPR) experiments were carried out to investigate the reducibility of nickel species and the interaction between nickel species and alumina. The catalytic hydrogenation of p-nitrophenol to p-aminophenol was investigated over the prepared nickel-based xerogel catalysts. The conversion of p-nitrophenol was monitored by UV spectrophotometry and high performance liquid chromatography (HPLC). The results show that the catalysts are highly selective for the conversion of p-nitrophenol to p-aminophenol and the order of catalytic activities of the catalysts is Ni< Ni-Al_2O_3 < Ni-Ca-Al_2O_3. The catalysts were recycled and were used to evaluate the reutilization.

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