Monika Kot et al., Int J Chem Res. 2020
DOI: dx.doi.org/10.18689/2642-1615.a3.003

Silica Modified with Ammonium Agents as a Support for Iridium Catalyst in Toluene Hydrogenation

Monika Kot*, Michał Zieliński, Ewa Janiszewska and Mariusz Pietrowski
Adam Mickiewicz University, Poland

The properties of silica, such as: low price, thermal stability, hardness, chemical resistance and nontoxicity make it one of the most frequently applied catalyst support. It has been shown that the activity of palladium catalysts for benzene, toluene and xylene hydrogenation is consistently higher with acidic supports than those with neutral silica [1,2]. For this reason modification of silica in order to generate the acidic properties seems to be especially interesting.

In this work, commercial silica (SiO_2) was modified using aqueous solution of ammonium fluoride (SiO_2-F) and ammonium chloride (SiO_2-Cl). The resulting materials were used as supports for iridium active phase. The catalysts containing 1 wt.% of iridium supported on silica were prepared by conventional impregnation method using hexachloroiridic acid as metal precursor. The prepared catalysts and supports were characterized by N_2 adsorption/desorption measurements and H_2-TPR. The mean size of metal particles was determined by hydrogen chemisorption measurements. The acidity of modified SiO_2 was estimated by means of temperature-programmed desorption of ammonia (NH_3-TPD). The effect of acidity of supports on the activity of iridium catalysts for toluene hydrogenation was studied. The catalyst supported on silica modified using ammonium fluoride is the most active.

Biography:

Monika Kot is a PhD student in chemistry at Adam Mickiewicz University in Poznań (Poland). Her research topics focus on heterogeneous catalysis. She works on synthesis and characterization of iridium and nickel catalysts supported on silica supports with different acidity and structural properties for hydrogenation reactions.