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Role of p-amino benzoic acid modifier on various characteristics of local rice husk silica- or bentonite clay-incorporated metallic nanoparticles used in selective dehydrogenation of ethanol to acetaldehyde

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p-amino benzoic acid (A) was used as a modifier for regulating the mesoporous characteristics of amorphous silica extracted from the local rice husk (RH), removal of which represents a serious problematic impact on the economic level. This amino acid was also used as a modifier for controlling the silicate layer characteristics of the local Egyptian bentonite clay (EB). Both our modified natural resources were used to immobilize metallic Ni nanoparticles. Various physicochemical properties of the systems, $(RHS\text{-}Ni\ -A)_{R350,}$ MEB-Ni (0.5, 1.0, 2.0 and 3.0 wt %) and MEB-Pt (0.5 wt %) were investigated via XRD, FTIR, TEM, TGA-DSC and N_2 adsorption techniques. They were applied as selective nanocatlysts for production of acetaldehyde through dehydrogenation of ethanol. The activity of in situ reduced $(RHS\text{-}Ni\text{-}A)_{R350}$ catalytic system was 5 times higher in acetaldehyde production than the corresponding unmodified $(RHS\text{-}Ni)_{R350,}$ catalyst. The catalytic activity of both MEB-Ni and MEB-Pt increased with temperature from 100o C to 150o C and dramatically decreased beyond this temperature. The selectivity toward acetaldehyde production at 150o C could be arranged as: MEB-0.5% Pt > MEB-0.5% Ni > MEB-1% Ni > MEB-3% Ni > MEB-2% Ni. Some discussions of the reaction mechanism were presented.

Biography

Nasser H. Shalaby has completed his B.Sc at the age of 22 years (Cairo university, 1988), from 1/1/1989 to 30/6/1990 serve the compulsory national service, from 07-1991 to 07-1995, Chemist at Saudi Arabia (Water Treatment), from 08-1995 to 09 -2005, Chemist at Egyptian Financial and Industrial Company (sulphuric acid and phosphatic fertilizers), from 09-2005 to 07-2009, Manager of Laboratories and Quality Control at Suez Company for Fertilizers Production, from 07-2009 till now, researcher at Egyptian Petroleum Research Institute. In 04 /2007, he has completed M.Sc on Nanocomposite polymers from Tanta University.In 01/ 2013 he has completed his Ph.D on Nanocatalysis from Ain Shams University.

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