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Catalysis, kinetics and reaction engineering

Ni nanoparticles supported on carbon as efficient catalysts for steam reforming of toluene (model tar) ☆

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Abstract

This paper investigated the influences of surface properties of carbon support and nickel precursors (nickel nitrate, nickel chloride and nickel acetate) on Ni nanoparticle sizes and catalytic performances for steam reforming of toluene. Treatment with nitric acid helped to increase the amount of functional groups on the surface and hydrophilic nature of carbon support, leading to a homogeneous distribution of Ni nanoparticles. The thermal decomposition products of nickel precursor also played an important role, Ni nanoparticles supported on carbon treated with acid using nickel nitrate as the precursor exhibited the smallest mean diameter of 4.5 nm. With the loading amount increased from 6 wt% to 18 wt%, the mean particle size of Ni nanoparticles varied