

DEVELOPMENT OF CATALYSTS IN CRYOCHEMICAL ROUTE FOR HYDRODESULPHURIZATION OF MODEL FUEL

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Abstract

In the present work, comparative studies on characteristics of the catalysts obtained using conventional and cryogenic methods, and the effects of the catalysts thus prepared on the catalytic hydrodesulphurization of a model fuel have been performed. Two catalysts, namely cobalt molybdenum oxide on alumina and nickel molybdenum oxide on alumina were prepared by conventional co-precipitation and cryo co-precipitation methods. The catalysts were characterized by BET surface area and pore volume analysis, X-Ray Diffraction, Field Emission Scanning Electron Microscope analysis, Transmission Electron Microscope analysis and Fourier Transform Infrared Spectroscopy. These analyses showed that catalysts prepared by cryo co-precipitation method impart high dispersion, surface area and chemical homogeneity compared to the catalyst prepared by conventional co-precipitation method.

Catalytic hydrodesulphurization of dibenzothiophene at a definite concentration in dodecane as model fuel was carried out in a stainless-steel batch autoclave using in situ generated hydrogen obtained by ethanol reforming. Liquid samples from the autoclave were collected at different time intervals and analyzed by high performance liquid chromatography. Experimental results showed that cryo-catalysts are much more active than conventional catalysts at all temperatures. Moreover, it also showed that nickel based catalysts give better performance for hydrodesulphurization of dibenzothiophene than cobalt based catalysts.

References:

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