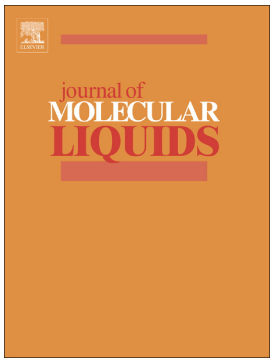

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PII: S0167-7322(18)32601-1
DOI: doi:10.1016/j.molliq.2018.09.118
Reference: MOLLIQ 9724

To appear in: *Journal of Molecular Liquids*

Received date: 19 May 2018
Revised date: 19 August 2018
Accepted date: 23 September 2018

Please cite this article as: Tawfik A. Saleh, Saddam A. AL-Hammadi, Ibrahim Munkaila Abdullahi, Mujahid Mustaqeem , Synthesis of molybdenum cobalt nanocatalysts supported on carbon for hydrodesulfurization of liquid fuels. Molliq (2018), doi:10.1016/j.molliq.2018.09.118

Synthesis of molybdenum cobalt nanocatalysts supported on carbon for hydrodesulfurization of liquid fuels

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Abstract

The effects of activated carbon support on the characteristics and efficiency of CoMo catalysts in the dibenzothiophene hydrodesulfurization were studied. Catalysts of Mo and Co were made with and without loading on activated carbon (AC) to form ACMoCo and MoCo catalysts, respectively. The AC support was synthesized from waste automobile tires material. The metal species (Mo and Co) were loaded by wetness impregnation of the salt solutions of the respective metals. The prepared materials were characterized by N_2-physisorption, temperature programmed analysis by desorption and reduction, X-ray diffraction, scanning electron microscope, energy-dispersive X-ray spectroscopy, inductively coupled plasma and Fourier transform Infra-red. The results indicated that ACMoCo showed a better performance in hydrodesulfurization starting with a model oil dibenzothiophene containing 500 ppm-S. 98.8% removal of the sulfur was achieved with ACMoCo compared to 73.5% for the MoCo under the same reaction conditions. The increased catalytic activity of ACMoCo catalyst in dibenzothiophene hydrodesulfurization can be explained by the nature of the catalyst support, which is of the high surface area and high acidity which attract the dibenzothiophene being of basicity nature. The analysis of the support on the catalyst activity was carried out based on the sulfur removal efficiency.