



Mesoporous Silica Impregnated by Ni and NiMo as Catalysts for Hydrocracking of Waste Lubricant

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Abstract : Impregnated of Ni and NiMo on mesoporous silica (SM) as catalysts in hydrocracking of waste lubricant has been evaluated. The SM was synthesized using gelatin of bovine bone as a template. Extraction of the gelatin was carried out using acid and alkaline solution followed by hydrolysis. The gelatin was analyzed by Fourier Transform Infra Red Spectrophotometer (FTIR) and that of the SM was characterized by FTIR, Surface Area Analyzer (SAA) and Transmission Electron Microscopy (TEM). The nickel was loaded onto the SM (Ni/SM Catalyst) by wet impregnation while the NiMo_(s)/SM catalyst was prepared by co-impregnation and that of by sequential impregnation. The catalysts were characterized using Atomic Absorption Spectroscopy (AAS), Scanning Electron Microscope (SEM), SAA, and gravimetric method. Activity of catalysts was tested in hydrocracking of waste lubricant. The result showed that maximum gelatin yield, was 10.69 wt.% extracted at 90 °C and consisted of Amide A, B, I, II dan III. The SM had pore diameter, specific surface area and pore volume of 7.98 nm, 550 m²/g and 1.10 cm³/g, respectively and showed wormhole-like structure. Total acidity of SM, Ni/SM, NiMo_(s)/SM and NiMo_(c)/SM samples was 5.1; 7.1; 6.7 and 7.3 mmol/g. The highest liquid product was achieved by NiMo_(c)/SM catalyst (43.22 wt.%) with the selectivity for gasoline and diesel fractions was 9.42 and 33.82 wt.%.
Keywords: Gelatin, silica, mesopore, catalyst, hydrocracking, lubricant.

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