

**EXTRACTION OF NAPHTHENIC ACIDS FROM PETROLEUM
CRUDE OIL UTILIZING 2-METHYLIMIDAZOLE IN ETHANOL**

SITI NUR AYUNI BINTI HASSAN

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ABSTRACT

EXTRACTION OF NAPHTHENIC ACIDS FROM PETROLEUM CRUDE OIL UTILIZING 2-METHYLIMIDAZOLE IN ETHANOL

Naphthenic acid (NA) has been recognized as one of the major sources of corrosion in oil production and refining process. In this study, catalytic extraction reaction was investigated in order to lowering the Total Acid Number (TAN) in crude oil to lower than 1.00 mg KOH g⁻¹ utilizing 2-methylimidazole with the aid of Ni/Ca(10:90)/Al₂O₃ catalysts. The catalyst were supported on the alumina through Incipient Wetness Impregnation (IWI) methods and calcined at calcination temperature of 800, 900 and 1000°C. Ni/Ca(10:90)/Al₂O₃ catalyst was characterized by using Thermogravimetry Analysis-Differential Thermal Analysis (TGA-DTA), X-ray Diffraction Spectroscopy (XRD), Brunauer-Emmett-Teller (BET), and Fourier Transform Infrared Spectroscopy (FTIR) to study physicochemical properties of the catalyst. The results shows that Ni/Ca(10:90)/Al₂O₃ catalyst successfully reduced number of acids in crude oil to lower than 1.00 mg KOH g⁻¹. Ni/Ca(10:90)/Al₂O₃ catalyst reduced TAN of crude oil from original TAN of 4.22 mg KOH g⁻¹ to 0.65 mg KOH g⁻¹ at 1000°C calcination temperature and catalyst loading of 7 beads (0.39%). This proven by XRD results that proposed Al₂O₃ face centered cubic (fcc) was an active site for Ni/Ca(10:90)/Al₂O₃ catalyst even though surface area, average pore volume and pore diameter was lower at calcination temperature at 1000°C. Stretching of N-H imidazole from 2-methylimidazole, C-H stretching from the NA species and pure metal oxides (M=O) stretching modes were detected on Ni/Ca(10:90)/Al₂O₃ catalyst at wavelength of 1455.96, 2952.2 to 2852.61 and 566.12 cm⁻¹ respectively by FTIR analysis. After catalytic extraction process which indicates that there were impurities have been adsorbed on the catalyst surface. The catalytic reaction was fixed at reaction time of 15 minutes and temperature at 27°C.