

**CATALYTIC STUDY OF Ni/Ce/Al₂O₃ FOR THE
EXTRACTION OF NAPHTHENIC ACIDS FROM
PETROLEUM CRUDE OIL**

NURUL HIDAYAH BINTI AZIZ

**BACHELOR OF SCIENCE (Hons.) CHEMISTRY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

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ABSTRACT

Catalytic Study of Ni/Ce/Al₂O₃ for the Extraction of Naphthenic Acid from Petroleum Crude Oil.

Naphthenic Acids (NAs) present in crude oil leads to corrosion problems in oil refinery equipment, storage, facilities and even reduces the performances of the oil. The aim of this study is to reduce total acid number (TAN) of petroleum crude oil using 2-methylimidazole with the aid of Ni/Ce(10:90)/Al₂O₃ catalyst through the catalytic deacidification technique. The catalyst were supported on the alumina through Incipient Wetness Impregnation (IWI) methods and calcined at calcination temperature of 800°C, 900°C and 1000°C. Ni/Ce(10:90)/Al₂O₃ catalyst was characterized by using Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction Spectroscopy (XRD) and Brunauer-Emmett-Teller (BET), to study physicochemical properties of the catalyst. The results shows Ni/Ce(10:90)/Al₂O₃ catalyst successfully reduced number of acids in crude oil to 0.50 from 4.22 mg KOH/g at 1000°C calcination temperature and catalyst loading of 0.39% (7 beads). XRD analysis proposed Al₂O₃ and CeO₂ fcc was the active site for Ni/Ce(10:90)/Al₂O₃ catalyst. C-H alkanes stretching, -CH₂- alkanes stretching and pure metal oxides stretching modes were detected on the catalyst at wavelength of 2952.49 to 2852.82, 1599.38, and 862.81 to 537.27 cm⁻¹ respectively by FTIR analysis after catalytic deacidification process which indicates that there were impurities that have adsorbed on the catalyst surface. The catalytic reaction was fixed at reaction time of 15 minutes and temperature of 27°C. As a conclusion, the catalysts successful reduce TAN value of acidic crude oil to less than 1.00 mg KOH/g.