

**EXTRACTION OF NAPHTHENIC ACIDS FROM ACIDIC
PETROLEUM CRUDE OIL UTILIZING 2-METHYLIMIDAZOLE
WITH THE AID OF CA/AL₂O₃ AND CE/AL₂O₃ CATALYSTS**

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ABSTRACT

NAPHTHENIC ACID REMOVAL FROM PETROLEUM CRUDE OIL UTILIZING 2-METHYLIMIDAZOLE IN POLYETHYLENE GLYCOL WITH THE AID OF Ca/Al₂O₃ AND Ce/Al₂O₃

Naphthenic Acids (NAs) found in crude oil is the major causes of corrosion problems in oil pipelines, distillation unit, storage, and facilities. As a result, crude oil with high NA will be marketed at lower price and considered as low quality. In this study, catalytic extraction reaction was done in order to lowering the Total Acid Number (TAN) in crude oil to below than one mg KOH/g utilizing 2-methylimidazole with the aid of monometallic Ca/Al₂O₃ and Ce/Al₂O₃ catalysts. The catalyst was supported on the alumina beads by Incipient Wetness Impregnation (IWI) methods and calcined at calcination temperature of 700°C. Thermogravimetry Analysis-Differential Thermal Analysis (TGA-DTA) was used to determine the suitable calcination temperature for both catalysts. Petronas Penapisan Melaka crude oil was selected to be tested with TAN of 5.30 mg KOH/g. The parameters studied were catalyst loading, and reaction times. The catalytic reaction was fixed at reaction temperature at 27°C. The result shows that Ca/Al₂O₃ and Ce/Al₂O₃ catalysts successfully reduced TAN value in acidic crude oil below than 1.00 mg KOH/g. Ca/Al₂O₃ catalyst gave a better reduction with 0.08 mg KOH/g of TAN value compared to Ce/Al₂O₃ catalyst which only reduced to 0.65 mg KOH/g of TAN value. Stretching modes of pure metal oxide (M=O) were detected before and after the reaction while CH₃ stretching, carboxylic acid (C=O) and CH₂ and CH₃ bend was detected after the reaction which indicates that there were impurities has been adsorbed on both catalyst by FTIR analysis. As a conclusion, Ca/Al₂O₃ is the best catalyst compared to Ce/Al₂O₃ since it lowered down acid number in crude oil to lowest value than Ce/Al₂O₃ catalyst. The catalytic method of extraction technique successfully in extract NAs from the crude oil. Thus, reducing the TAN value to less than 1 mg KOH/g.