

**NEUTRALIZATION OF HIGHLY ACIDIC CRUDE OIL UTILIZING
2-METHYLIMIDAZOLE IN POLYETHYLENE GLYCOL
SOLUTION**

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ABSTRACT

Neutralization of Highly Acidic Crude Oil Utilizing 2-Methylimidazole in Polyethylene Glycol Solution

The naphthenic acids (NA) compound occurs naturally in the acidic crude oil and caused corrosion problem in refinery processing. Various methods can be used to reduce the NAs concentration of acidic petroleum crude either by using catalytic decarboxylation, dilution or caustic washing but all these methods have their own drawbacks. The objective of this study is to reduce TAN value of crude oil by neutralization process using catalyst and reagents. The TAN value can be determined when testing on crude oil sample with various parameters such as catalysts calcination temperature, catalyst loading and reagent concentration. The acid removal agent used is a mixture of 10% 2-methylimidazole in PEG with reagent concentration of 100, 500, 1000 and 1500 ppm. Calcium was chosen as a base for the catalyst while Cu and Ni were used as a dopant. The potential catalyst was characterized by FTIR and TGA-DTG for its physical and chemical characteristics. The alumina supported catalysts were prepared at different calcination temperatures of 800°C, 900°C and 1000°C. The FTIR results showed that the CH-stretching of both catalysts after reaction might come from the PEG reagent for impurities occurred around 1437.96-2921.9 cm^{-1} . TGA-DTG thermogram showed a complete formation of metal oxide occurred at 670°C. Total weight loss for Cu/Ca and Ni/Ca (10:90)/Al₂O₃ are 24.76% and 25.70% respectively. By using a catalyst with calcination temperature 1000°C, 7 beads of catalyst loading, 500 ppm of 2-methylimidazole in PEG, reaction temperature (35°C) and 5 minutes reaction times, the result shows 97% deduction of TAN value from 3.93 to 0.13 mg KOH/g respectively. In conclusion, the TAN value of PPM crude oils was successfully reduced to below than 1 mg KOH/g by catalytic neutralization method which offered simple technique and environmentally friendly.

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