

Total acid number (TAN) reduction of high acidic crude oil via catalytic esterification of naphthenic acids for reducing corrosion problem of petroleum oil refineries

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In the present work, naphthenic acids were removed by catalytic esterification with methanol using heteropolyacids well dispersed on suitable support as heterogeneous solid acid catalyst to corresponding esters for reducing corrosion problem of petroleum oil refineries and to improve the properties of the oil. The influence of reaction parameters such as temperature and liquid hourly space velocity was investigated in a fixed-bed continuous up flow micro-reactor. The experiment optimum reaction conditions were determined to reduce the total acid number to an acceptable label for the petroleum refineries with very less methanol consumption at a reaction temperature of 250 °C and a liquid hour space velocity of 3 h⁻¹. Total acid number of high acidic crude oil was reduced from 2.00 mg KOH/g to lower than 0.5 mg KOH/g, which is acceptable label to process in the current petroleum refineries.