

Kinetic study of hydrogenation reaction in a slurry-phase hydrocracking of vacuum residue oil

Pham Hai Hung, 권은희¹, 고강석^{1,†}, 노남선¹, 임석현¹,

김광호¹, Pham Anh Dung

한경대학교; ¹한국에너지기술연구원

(ksgo78@kier.re.kr[†])

A kinetic model was developed for catalytic hydrogenation reactions of vacuum residue in a CSTIR with a commercial slurry-phase catalyst (Mo-octoate). The kinetic model included hydro-desulfurization, hydrodenitrogenation, hydrodemetallization, hydrode-asphaltenization, hydrodemicrocarbonization. The experiments were conducted at the severe operating conditions with temperature range of 410 – 450 °C, liquid hourly space velocity (LHSV) of 0.25 – 1 hr⁻¹, hydrogen pressure of 160 bar, gas to oil ratio (GOR) of 1500 Nm³/m³, and concentration of Molybdenum of 500 ppm. The developed kinetic model accounted for mass transfer and vapor-liquid equilibrium. The developed kinetic model was well in agreement with experimental data.