

Catalytic cracking of vacuum residue over ZrO₂-impregnated red mud catalysts with steam

Nguyen Huy Chinh, 신은우*

울산대학교

(ewshin@ulsan.ac.kr*)

ZrO₂-impregnated red mud catalysts were employed as a novel catalyst for catalytic cracking of vacuum residue with steam. Under the batch reaction condition at 470 °C for 2 h with superheated steam, 3 wt% ZrO₂-impregnated red mud exhibited the best performance for catalytic cracking of vacuum residue. Furthermore, under the same reaction condition, the conversion and liquid yield of 3 wt% ZrO₂-impregnated red mud were higher than those of 3 wt% ZrO₂-supporting Al-FeO_x, a well-known catalyst for catalytic cracking of heavy oil with steam. The better catalytic performance of 3 wt% ZrO₂-impregnated red mud was due to large surface area and high catalyst stability. X-ray diffraction data of the spent catalysts showed that iron oxide phase in 3 wt% ZrO₂-impregnated red mud maintained a hematite structure while it in 3 wt% ZrO₂-supporting Al-FeO_x was transformed to magnetite, inactive phase for catalytic cracking.