

Study of NiK/yCe_xZr_{1-x}O₂-MaAl₂O₃ catalysts in cracking reaction of vacuum residue with steam

Pham Thanh Truc, 도티리엔¹, 전홍비, 신은우^{1,†}

울산대학교; ¹울산대학교 화학공학과

(ewshin@ulsan.ac.kr[†])

In this study, NiK/yCe_xZr_{1-x}O₂-MaAl₂O₃ catalysts were synthesized by dispersing different amounts of Ce_xZr_{1-x}O₂ phase onto macroporous -Al₂O₃ as supports, and then subsequently impregnating Ni and K into the supports, which possessed advantageous properties, such as a high surface area, ordered macropores and high oxygen storage capacity. Moreover, the introduction of Ni and K metals into these supports created more oxygen vacancies in them. These catalysts were applied to the cracking of vacuum residual oil with steam in a fixed bed reactor under atmospheric pressure. The macroporous alumina played an important role in enhancing the accessibility of large molecules to the active sites, while the high oxygen storage capacity (OSC) over the Ce_xZr_{1-x}O₂ phase improved the oxidative cracking rate. Therefore, the lighter oil fraction from the vacuum residue increased significantly.