

Methanol Synthesis over the Metal modified Cu/ZnO/Al₂O₃ Catalyst under the Low-pressure Conditions

송현태^{1,2}, 홍기훈^{1,2}, 김현동^{1,3}, 노영수^{3,1}, Nasim Ghaffari Saeidabad^{1,2}, Ali Alizadeh Eslami^{1,2}, 문동주^{1,†}
¹KIST; ²UST; ³고려대학교
(djmoon@kist.re.kr[†])

In recent years, environmental issues on climate change and air pollution have created tremendous interest in the production of clean fuels. In this regard, the methanol synthesis process is considered the most promising technology for the production of clean fuels using natural gas from stranded or associated gas. In the case of the remote natural gas fields, MeOH-FPSO (Floating production storage and offloading) process is a desirable option which poses an essential impact in reducing the CO₂ emission and achieving the economical production of the clean fuels.

In this research, the methanol synthesis reaction over metal modified Cu/ZnO/Al₂O₃ prepared via impregnation method using various promoters (Co, Ru, Mn, Zr). The prepared catalysts were characterized by N₂ adsorption, XRD, TPR, TPD, and TGA technologies. The methanol synthesis reaction was carried out at T = 240 °C, P = 30 bar, GHSV = 4000 h⁻¹ and H₂/CO = 2 in a fixed bed reactor. The catalytic performance over the prepared catalyst was compared with the commercial Cu/ZnO/Al₂O₃ catalyst.