

Combined Reforming of Methane over Nano-sized Ni Catalysts Supported on MgO-Al₂O₃

구기영, 노현석¹, 서동주¹, 서유탉¹, 서용석¹, 정진혁², 이득기³, 박승빈, 윤왕래^{1,*}
한국과학기술원; ¹한국에너지기술연구원; ²경북대학교;
³광주대학교
(wlyoon@kier.re.kr*)

Combined steam and carbon dioxide reforming of methane has come to attention on account of the fact that adequate H₂/CO ratios in synthesis gas can be controlled for application of oxo-synthesis and Fischer-Tropsch process. In this study, H₂/CO ratio of 2 was achieved in combined reforming of methane over Ni/MgAl₂O₄. The Ni/MgAl₂O₄ catalyst was prepared by an incipient wetness method and characterized by XRD, BET and H₂-TPR. The reaction was performed with the ratio of (H₂O+CO₂)/CH₄ of 1.2 at 800 °C. To optimize the condition of reforming, the ratio of H₂O/CO₂ as oxidative species was changed from 2 to 3. Under the condition of GHSV = 132,702 ml/h g_{cat}⁻¹, Ni/MgAl₂O₄ catalyst exhibited good catalytic activity and stability compared with commercial catalyst (Sud-chemie). In addition, the effect of pre-calcination temperature on the catalytic stability was investigated at GHSV = 265,404 ml/h g_{cat}⁻¹. The catalytic stability increases with an increase of pre-calcination temperature.