

The characteristics of Ni-MgO-CeO₂, Ni-MgO-ZrO₂ and Ni-MgO-Ce_(1-x)Zr_(x)O₂ catalysts methane reforming with carbon dioxide

김태광¹, 박민주¹, 정대운^{1,2,†}

¹창원대학교 친환경해양플랜트FEED공학; ²창원대학교 토목환경화공융합공학부
(dwjeong@changwon.ac.kr[†])

The DRM reaction converts CH₄ and CO₂ into synthesis gas (CO + H₂), which is a basis for the synthesis of oxygenated chemicals such as acetic acid, dimethyl ether, and oxo-alcohols. CeO₂, ZrO₂, and CeO₂-ZrO₂ supported on MgO-promoted Ni catalysts are developed and applied to the reforming of methane with carbon dioxide. Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ catalyst shows high activity as well as stability with time on stream. The size of the Ni particles and the oxygen storage capacity are found to be the primary and secondary key factors that influence the catalytic performance respectively. The Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ catalyst showed the best performance for the reforming of methane with carbon dioxide because of the high reduction degree and small Ni particle size. In the present study, we focus on the variation of Ni particle size and oxygen storage capacity with the CeO₂-ZrO₂ composition Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ support to further improve the performance of the catalyst.