

Partial oxidation of methane over ceria-promoted nickel-calcium hydroxyapatite catalysts

김기훈, 이상엽, 윤기준*
성균관대학교
(kijyoon@skku.edu*)

It has recently been reported that nickel-calcium hydroxyapatite(Ni-CaHA) catalysts exhibit high activity and selectivity in partial oxidation of methane. In this work, the effects of ceria added as a promoter to a Ni-CaHA catalyst(molar composition: Ni:Ca:(PO₄) = 2.5:10:6) were investigated. Ceria-promoted Ni-CaHA catalysts showed higher activity and stability than the unpromoted Ni-CaHA catalyst. The optimum mole ratio of Ce/Ni was found to be around 0.2/2.5. A long-term test of the optimum ceria-promoted Ni-CaHA catalyst was carried out at 1,023 K. Deactivation of the catalyst occurred slowly, but the catalyst could easily be regenerated by treating with oxygen. The promotional effects of ceria are considered due to its oxygen storage capacity, which enhances the formation of oxygen vacancies and the mobility of oxygen and suppresses carbon deposition.