Catalytic Activity and Characterizations of Ni/MTi_xO_y-Al_2O_3 (M=K, Ca) Catalyst for Steam Methane Reforming

이소연, 우희철*
부경대 화학공학과
(woohc@pknu.ac.kr*)

Steam reforming of hydrocarbons has mainly considered as recent topic for fuel processing due to high productivity of hydrogen gas. Although the development of various catalysts for the process has studied, the catalyst deactivation is still a major drawback of technical advancement. Therefore, the objective of this study was to investigate the catalytic stability of modified nickel catalysts containing MTixOy-Al2O3 (M= K and/or Ca). Nickel catalysts supported on MTixOy-Al2O3 were prepared by the wet impregnation method. The activity of Ni/K2TixOy-Al2O3 was comparable to that of FCR-4 for steam methane reforming. The stability test at 800℃ and the steam-to-carbon ratio of 1.0 indicated that the Ni/K2TixOy-Al2O3 catalysts has more higher activity, resistance to deactivation than Ni/Al2O3. In addition, the Ni/CaTixOy-Al2O3 catalysts presented superior sulfur-tolerance while significant loss in activity was observed over the Ni/Al2O3 catalyst. Consequently, both K2TixOy and CaTixOy would be a promising additive material of alumina supported nickel catalyst for steam methane reforming, effectively inhibiting deactivation from sintering of catalyst as well as sulfur poisoning.