Enhancement of Hydrothermal Stability of MFI Zeolite by Titania Modification

최동배, 김종호, 서 곤*
전남대학교 응용화학공학부
(gseo@chonnam.ac.kr*)

The high hydrothermal stability of zeolites in the catalytic cracking is required to maintain their catalytic activities. Titania-modified MFI zeolites were prepared by reacting MFI zeolite with titanium alkoxides followed by calcination. MFI and titania-modified MFI zeolites were treated with steam at 700 ℃ for 6 and 12 h. Physico-chemical properties of the zeolites were investigated by XRD, N_2 adsorption, ^{29}Si and ^{27}Al NMR, ammonia TPD and IR study of adsorbed pyridine. The decrease in catalytic activity of the zeolites by hydrothermal treatment was examined in *n*-octane cracking at 400 – 500 ℃. The negligibly small diffraction peaks of titania on the titania-modified MFI zeolites showed its high dispersion. However, the titania treatment did not prevent the extraction of aluminium from the skeletal of MFI zeolite during hydrothermal treatments, losing its Brönsted acid sites. Nevertheless, the catalytic activities of titania-modified MFI zeolites after hydrothermal treatment were high compared with that of MFI zeolite. Titania incorporated on the outer surface of MFI zeolite suppressed partially the extraction of aluminium, resulting in better activity in the catalytic cracking of *n*-octane.