

Non-oxidative propane dehydrogenation over $\text{Fe}_a\text{Zr}_b\text{O}_x$ catalyst최형주, 윤용주^{1,†}포항공과대학교; ¹포항공과대학교 조교수(yjyun@postech.ac.kr[†])

ZrO_x -based metal oxides have attracted attention as alternative catalysts for non-oxidative propane dehydrogenation due to the high cost or toxicity of conventional catalysts. We have investigated $\text{Fe}_a\text{Zr}_b\text{O}_x$ catalyst for PDH. The catalytic properties of bulk zirconium and $\text{Fe}_a\text{Zr}_b\text{O}_x$ catalyst were compared to find out the effect of iron species on the catalytic performance. These were pretreated with H_2 and reaction was occurred at 600°C , 1atm total pressure. The catalysts were characterized by N_2 - physisorption, ICP, NH_3 -TPD, TPR, XRD. The results obtained from NH_3 -TPD show that addition of Fe creates more acid sites. TPR spectra suggests that excessive reduction leads to lower propylene selectivity by generating the bulk iron species which cause the side reactions. The activity of the $\text{Fe}_a\text{Zr}_b\text{O}_x$ catalysts exhibits a volcano-type tendency with an increase in loading of iron. Compared with bulk zirconium, $\text{Fe}_a\text{Zr}_b\text{O}_x$ catalysts show 50% higher propylene yield.