

Adsorption and catalytic oxidation of toluene over silver/molecular sieves

백세원, 김정량, 임선기*
한국과학기술원
(skihm@kaist.ac.kr*)

Ag/HY was suggested as a good candidate for the control of low concentration VOCs (volatile organic compounds) by adsorption-oxidation combined process. In this study, the effect of hydrophobicity (or Si/Al ratio) of zeolite HY on the adsorption and catalytic oxidation of toluene were investigated. The hydrophobic HY (Si/Al=80) showed superior adsorption capacity to hydrophilic HY (Si/Al=5.1) at low partial pressure region. The activity of Ag/HY(x=Si/Al ratio) catalyst on toluene oxidation increase with hydrophobicity at fixed silver loading of 6 wt%. Moreover the CO₂ selectivity was enhanced with increase of Si/Al ratio. Therefore, It could be inferred that the hydrophobic nature of zeolite support should be important not only for enhancing the VOC adsorption properties but also for increasing the catalytic activity and selectivity toward complete oxidation. Further catalyst characterization were carried out to explain the relation between the zeolite's acidity and toluene oxidation activity.