

Complete Oxidation of Toluene over Pd/Al₂O₃ Catalysts

남승원, 문주현, 심왕근¹, 김상채*

목포대학교 환경교육과; ¹전남대학교 공과대학 응용화학공학부

(gikim@mokpo.ac.kr*)

Catalytic oxidation has been widely considered as an effective tool for controlling the emission of the volatile organic compounds due to its lower thermal NO_x emissions and higher destructive efficiency. Therefore, in this study, the complete oxidation of toluene in low concentration (1000 ppm) was carried out over four different weight percentage of Pd/Al₂O₃ in a fixed bed flow reactor system at atmospheric pressure. In addition, two different pre-treatment methods such as air and hydrogen were employed to examine the activity of Pd based catalysts. To characterize the parent and pre-treated catalysts, X-ray diffraction (XRD), Brunauer Emmett Teller method (BET), transmission electron microscopy (TEM), temperature programmed reduction (TPR) and X-ray photoelectron spectroscopy (XPS) were used. According to the results of light-off curves, the catalytic activities of parent samples increased with increasing palladium loadings and the hydrogen pre-treated catalysts which have mainly metallic form were more active in catalytic oxidation than oxidized catalysts. This work was supported by the Korea Institute of Environmental Science and Technology (KIEST).