

**PHOTOCATALYTIC DEGRADATION OF NITROGEN OXIDES ON TITANIA UNDER UV AND VISIBLE LIGHT IRRADIATION AND APPLICATION IN OUTDOOR AIR PURIFICATION****Y.H. Tseng<sup>1</sup>, C.C. Chen<sup>2</sup>, J.H. Huang<sup>1</sup>, Y.M. Lin<sup>1</sup>**<sup>1</sup>*Center for Environmental, Safety and Health Technology, Industrial Technology Research Institute, Hsinchu, Taiwan*<sup>2</sup>*Department of Chemical Engineering, National Tsing-Hua University, Hsinchu, Taiwan*

The ultraviolet and visible light activated titanium dioxide was synthesized and employed in the photocatalytic oxidation of NO. Sol-gel process by using tetra-n-butyl orthotitanate and ethanol to synthesize mixed-crystal (anatase and brookite) titanium dioxide were carried out under acid catalyzed condition. Platinum was loaded with impregnation method on the surface of titanium dioxide to modify the property. The prepared photocatalysts were activated in the degradation of NO<sub>x</sub> under illumination peaked at 365, 404, 435, 500, and 546 nm, respectively. The activated energy of generation of hole-electron pair on titanium dioxide surface was decreased with the existence of platinum added either in the sol-gel process or by the impregnation method. The experimental results showed that near 50% removal of NO could be obtained in a flow type reaction system under visible light irradiation. Effect of relative humidity, inlet flow rate, concentration of NO<sub>x</sub>, intensity of irradiation, and amount of platinum on the reaction rate and visible light sensitivity were investigated in this work. Furthermore, an outdoor air purification device with photocatalyst was developed under the sunlight irradiation. The result of outdoor test showed high potential application of photocatalyst in the removal of NO<sub>x</sub> contaminants.