【심포지움-광촉매 06】

TiO_2상의 Pt 나노입자가 표면 광화학반응에 미치는 영향과 환경응용

최원용
포항공과대학교 환경공학부

TiO_2 photocatalysis has been extensively studied for its environmental applications and demonstrated to be a technically viable clean-up process.[1] The main drawbacks of the low quantum yields and the lack of visible-light utilization, however, hinder its widespread acceptance as a practical remediation technology. Various approaches have been attempted to enhance the photocatalytic efficiency of TiO_2, which include metal-ion doping, metallization, and sensitization. In this study, we investigated and compared the effects of depositing nano-sized metal particles (M: Pt, Au) on TiO_2 in four different photocatalytic systems: (1) dye-sensitized M/TiO_2 for the visible light photocatalytic degradation of perchlorinated compounds, (2) M/TiO_2 photocatalyst for ammonia removal, (3) M/TiO_2 photocatalyst for trichloroacetate (TCA) degradation, and (4) M/TiO_2 photocatalyst for CO oxidation. The Pt and Au particles were photodeposited on TiO_2 (Degussa P25) with a typical loading of ca. 0.2 wt%. The transmission electron microscopic (TEM) images showed that Pt particles with a size range of 1-2 nm were well dispersed on TiO_2 particles (20-30 nm diameter). The photocatalytic activity and mechanism of Pt/TiO_2 was significantly different from those of pure TiO_2. Although the platinization of TiO_2 has been widely studied, its effect on the photocatalytic mechanism is not well understood. The role of metals and their effect on the photocatalytic reaction system will be discussed.

[참고문헌]

1. M. R. Hoffmann, S. T. Martin, W. Choi, D. W. Bahnemann, "Environmental Applications of Semiconductor Photocatalysis" Chem. Rev. 95, 69 (1995).