

Preparation of $\text{TiO}_2/\text{SiO}_x$ Double-Layer Films on Particles and Its Application to Phenol Removal

Pham Hung Cuong, 김교선^{1,*}
강원대학교; ¹강원대학교 화학공학과
(kkyoseon@kangwon.ac.kr*)

The $\text{TiO}_2/\text{SiO}_x$ double-layer films were coated on the polypropylene (PP) beads by a rotating cylindrical plasma chemical vapor deposition (PCVD) process and the photocatalytic activity of double-layer films was tested for the photodegradation of phenol in aqueous solution. The thickness of $\text{TiO}_2/\text{SiO}_x$ double-layer could be controlled easily by the deposition time. The photodegradation rate of phenol by double-layer films on the PP beads increases as the initial phenol concentration increases or as the number of PP beads coated with double-layer films increases in aqueous solution. The presence of the SiO_x bottom-layer improved the photocatalytic activity of the TiO_2 layer because it may act as a trap for electrons generated in the TiO_2 layer, thus, preventing the electron-hole recombinations. The rotating cylindrical PCVD process can be a good method to coat the high-quality double-layer films on the particles. It is proposed that the particles coated with double-layer films can be applied to the removal of water pollutants with high efficiency.