

Tetra(4-hydroxyphenyl)porphyrin and Tetra(4-carboxyphenyl)porphyrin sensitized TiO₂ for Photocatalytic Degradation of Dyes under Visible Light

최지나*, 유지선, 김범식
한국화학연구원
(jchoi@kriect.re.kr*)

Porphyrins are well known photosensitizer because of their strong absorption in visible region. Here, tetra-phenyl-porphyrin (TPP), tetra-4-hydroxyphenyl-porphyrin (THPP), and tetra-4-carboxyphenyl-porphyrin (TCPP) were successfully synthesized and anchored on TiO₂ nanoparticulates. It was observed that TCPP adsorbed strongly and irreversibly onto TiO₂ surface when compared with THPP. However, TPP hardly adsorbed onto TiO₂ due to the lack of anchoring group. The photoreactivity of porphyrin sensitized TiO₂ was tested for the degradation of dyes such as methyl orange (MO) and methylene blue (MB) in suspension under visible light irradiation with > 420 nm. TCPP-TiO₂ showed the best visible light photoreactivity for the dye de-colorization among the all sensitized TiO₂ samples including CdS-TiO₂ inorganic sensitizing system. It was also observed that the photocurrent was efficiently generated with TCPP-TiO₂ prepared in a film form under visible light. Incorporation of metal ions such as Zn, Cu, and Sn in TCPP was also investigated.