

Natthapon Warapo 2011: Photodegradation of Organotin Compounds in Aqueous TiO₂ Suspension. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Apisit Songsasen, Ph.D. 135 pages.

The photodegradation of organotin compounds (TBT, DBT and MBT) in aqueous TiO₂ suspension was studied. First, a procedure for the determination of organotin compounds in water samples was optimized. The extraction efficiency of organotin compounds depends on amount of tropolone, NaCl and pH. The appropriate conditions of extraction were pH 1.66, concentration of tropolone was 0.05% in hexane and amount of NaCl were 60 mg. Moreover, the stoichiometries of complexes between MBT and DBT with tropolone were determined by continuous variation method. The stoichiometric ratio DBT:tropolone and MBT:tropolone were 1:1 and 1:2, respectively. The N-doped TiO₂ photocatalyst was prepared via the sol-gel method using titanium(IV) tetraisopropoxide as a precursor. The results from photodegradation of TBT under UV-light irradiation, using N-doped TiO₂, P25-TiO₂ and undoped TiO₂ and without catalyst indicated that P25-TiO₂ was able to degrade TBT with the highest conversion efficiency. Under visible light and natural light illumination, N-doped TiO₂ provided the best catalytic efficiency for TBT, DBT and MBT. The rate constant of photodegradation of DBT and MBT were higher than TBT with the order of MBT > DBT > TBT. MBT was detected as intermediate product of the photodegradation of DBT under natural light illumination. The photodegradation of mix organotins solution under natural light illumination, after 2 h, the amount of TBT increased because the recombination process of MBT and DBT. N-doped TiO₂ effectively degraded TBT in sea water from Lam Chabang Harbour Gulf of Thailand which was contaminated by TBT.

Student's signature

Thesis Advisor's signature