E2-46 Photodegradation of organic pollutants by semiconductors

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Organic pollutants such as phenol, chlorophenols have been degraded photochemically by semiconductors as TiO_2, ZnO. In this study, photodegradation of 3,4 DPA (3,4 dichloropropioanilide) by artificial illumination in the presence of TiO_2 was carried out. Effects of various parameters on this photodegradation process were also investigated.

Photodegradation was done in a photochemical reactor by irradiating a mixture of an aqueous solution of 3,4 DPA and TiO_2 (Anatase) using a mercury lamp ($\sqrt{}$=365-366 nm), while bubbling dioxygen through the medium. Samples were withdrawn at different time intervals, centrifuged to remove TiO_2 and subjected to analyses. During the irradiation 100% degradation and dechlorination of 3,4 DPA occurred within 4-5 h of irradiation in the presence of TiO_2 and formation of Cl^-, H^+, NO_3^- and CO_2 were observed. Under these conditions 75% of organic nitrogen in 3,4 DPA formed NO_3^- ions and pH decreased from 4.3 to 2.8. Complete oxidation of organic C to CO_2 was not observed even

after irradiating for 32 h. In the absence of TiO_2, photodegradation and dechlorination were only 30% within 7 h of illumination.

When the amount of TiO_2 added was increased from 100 to 200 mg dm^{-3}, photodegradation of 3,4 DPA decreased due to the shielding of incident light by TiO_2 particles. Photodegradation was higher when the initial pH was acidic or basic than when it was neutral.

3,4 DPA could be photodegraded by artificial illumination in the presence of TiO_2 and dioxygen to Cl^-, NO_3^- and CO_2.

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