Photocatalytic degradation of nitrotoluene in aqueous TiO2 suspension

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Abstract: TiO2-mediated photocatalytic degradation process was employed to treat aqueous 2-, 3- and 4-NT (nitrotoluene) pollutants. The NT disappearance and TOC removal rates for three isomers showed no significant differences. Three hydroxylated aromatic intermediates resulting from the photocatalytic degradation of 4-NT were identified; this suggested two (initial) degradation pathways. Formation of acetic acid, formic acid, and formaldehyde was also noted. The mineralization products included NH4+, NO3- and CO2. N2 bubbling or the presence of a positive hole acceptor during 4-NT degradation resulted in a high 4-aminotoluene formation. This indicated an effective reduction of 4-NT's nitro group to amino moiety. Generally, Pt-loaded TiO2 (Pt-TiO2) had no influence on the disappearance rate of 4-NT. However, the use of Pt-TiO2 along with a higher light intensity source resulted in an accelerated TOC removal.