Enhanced photocatalytic activity of nafion-coated TiO2

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Abstract: Photocatalytic degradation (PCD) of aqueous paraquat was accelerated by the addition of either phosphate or sulfate salt. Attachment of these anions to the TiO2 surface possibly results in increased adsorption of the cationic paraquat species and in turn its photocatalysis rate. The same effect was obtained more consistently using the Nafion (an anionic polymer)-coated Ti02. Enhanced PCD of paraquat and some amine compounds was noted. However the anionic and neutral compounds were not affected significantly. Nafion proved to be stable against photocatalysis. It has been suggested that the degradation rate is larger for the cationic compounds with higher pKa. For a phenol-paraquat-TiO2 system, paraquat degradation did not begin till near-complete phenol removal. Using the Nafion-coated TiO2, both phenol and paraquat degradations started simultaneously. Nevertheless, complete paraquat removal still took longer than phenol.