

Photocatalytic Degradation of Various Ionic Liquids (ILs) in Aqueous Solution

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Ionic liquid (ILs) have increasingly attracted attention as green solvent because of its stability and negligible vapor pressure. Ionic liquids can be used as alternative solvents for synthesis and catalysis, as alternative electrolytes, and as alternative lubricants. This broad applicability of ionic liquids will cause potential problems with degradation or persistence in the environment. In this study, we have studied the photodegradation and photocatalytic degradation of ionic liquids in aqueous solution. The photocatalytic degradation of 17 ionic liquids with different structure has been investigated using TiO_2 (Degussa P25) under 300W UV light irradiation and the direct photolysis was performed in the absence of TiO_2 . The results show that ILs were efficiently degraded in alkyylimidazolium with shorter alkyl chain length, but the alkyylimidazolium ILs having the specific counter anion such as I^- and SCN^- were not degraded under the same conditions. In addition, pyridinium-type ILs were more persistent than imidazolium-type ILs. Several experimental parameters such as amount of catalyst, concentration of ionic liquid, and pH have been also optimized.