Pimporn Phoacharern 2006: Photocatalytic Degradation of Trypan Blue Using Gold/Titanium Dioxide. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry.
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An azo dyes are the largest group of the dyes used in dyeing industry, and the use of them is that they must be highly stable. Therefore, their remaining in effluents causes the environmental problem, moreover, azo dyes may be decomposed into carcinogenic compounds. Although photocatalytic degradation with titanium dioxide (TiO_2) is an efficient process, there are a few drawbacks. The objective of this research is to enhance the efficient of TiO_2 and utilize the solar light for treatment of Trypan Blue with gold deposition.

Gold deposited TiO_2 has been prepared by reducing $[AuCl_4]^-$ on the surface of preformed TiO_2 colloids using sodium borohydride in acetonitrile. The effect of gold contents, calcination temperature, initial pH of Trypan Blue, gold/TiO_2 dosage and dye concentration on the photocatalytic activity under a solar light simulating source (Xe-arc lamp, 150W) radiation using Trypan Blue were investigated. The change in dye concentration and formation of intermediates were monitored as a function of irradiation time. The rate of disappearance of dye follows first order kinetics. The degradation rate of 50 ppm Trypan Blue is complete within 50 min in the presence of 0.36% gold/TiO_2 that faster than in the presence of TiO_2 more seven folds, focusing at first 30 min of irradiation. In addition, this method has been applied to the wastewater. The Trypan Blue which spiked in wastewater disappears in 2 h. As a result, gold doped on TiO_2 could improve the photodegradation efficiency of Trypan Blue, although, it required longer irradiation time in the case of wastewater sample.

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