ABSTRACT

Synthesis of Nano-Metal Oxide for Photodegradation of Toxic Organic Pollutants in Water under Sunlight

Senior Project Submitted to the Department of Chemical Engineering

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Heterogeneous photocatalysis is an advanced oxidation process which has been the subject of a huge amount of studies related to air cleaning and water purification. All these processes have been carried out mainly by using TiO$_2$-based materials as the photocatalysts. The present study was performed to use Heterogeneous photocatalysis in treatment of water from synthetics dyes in a simple reactor. The parameters of the preparation of Heterogeneous photocatalysis as well as photodegradation of dye were justified in the optimum conditions through the experimental work. Fabrication of Zero dimensional zero-valent Ag nanoparticles - doped TiO$_2$ nanoparticles with high aspect ratio have been successfully synthesized by simple and low cost; sol-gel process. The photocatalytic activity of introduced nanoparticles was evaluated by performing of Methylene blue. Introduced NPs were compared with the pristine TiO$_2$ NPs. Also, we study the effect of silver concentration in the titania nanoparticles. In comparative experiments, synthesized Ag NPs-doped TiO$_2$ NPs showed the higher photocatalytic activity than pristine TiO$_2$ NPs. Moreover, photocatalyst nanoparticles appeared good stability, which was used for three cycles without regeneration.

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