Syhthesis and Characterization of Magnetite Iron Oxide Nanoparticles Application to the Degradation of Rhodamine B in Waste water

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Abstract:

A significant amount of pollution is affecting the environment as a result of various factors. Among these factors include pharmaceutical waste, chemical waste discharges, pollution, and others. We have therefore turned to a method of treating these wastes to lessen the impact of pollution. Based on a study of photocatalytic activity using a supramagnetic catalyst—the magnetic iron oxide (Fe_3O_4)—photocatalysis offers the potential for the degradation of pollutants.

The magnetic iron oxide, or magnétite (Fe_3O_4), was produced chemically, and the nanoparticles were identified by diffraction of X-rays (DRX) and microscopy with balayage coupled to EDS (MEB-EDS). The synthesized particles were used as a catalyst for the degradation of pollutants that were already present, including Rhodamine B.

The following parameters were used to study the photodegradation of Rhodamine B: effect of catalyst mass, effect of solution pH, and effect of catalyst concentration.

The results obtained showed a good efficiency of Rhodamine B degradation. The best result is reached for acid pH (PH=2.36), at mass m=30mg and concentration C=3ppm for a minimal time of 35 min.

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Keywords: Magnetite, Characterization, Photocatalysis, Degradation of pollutants, Rhodamine B.