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Photocatalysis of Rhodamine B in water using nanotechnology

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There are several techniques currently used for water organic contaminants removal, including Activated Carbon Adsorption, Chlorination, UV Photolysis, Ozonation, and Ferrate Oxidation. Although these techniques are useful in treating contaminated water, they have limitations in terms of removal completion, efficiency, rates, and operational costs. In addition, the methods for identification and quantification of both organic contaminants and the reaction products in water treatment are not well developed. We developed the method of combining the nanotechnology and the tandem water contaminants detection apparatus, namely Fourier transform infrared spectroscopy-Attenuated total reflectance (FTIR-ATR) and UV/Vis spectroscopy. This will allow efficient, low cost removal of organic contaminants from water, with the removal process being constantly monitored for both contaminants and products. Our research consists of coating nanoparticles (graphite oxide) along with nano-inorganic materials (CdS) on a surface for photocatalysis of water contaminants under radiation of visible light. Rhodamine B has been used as a water contaminant surrogate to test our nano-technical treatment methods. Our preliminary results indicate that Rhodamine B in water undergoes photocatalysis with visible light in the presence of nano materials accordingly to the observation that the color of the sample solution was changed from red to green-yellow after the photocatalysis. The degradation rate and products of Rhodamine B photocatalysis in water will be discussed.

Biography:

Dr. Zhuangjie Li obtained his Ph.D. in Physical Chemistry with primary focus on atmospheric chemistry at Wayne State University (Detroit, Michigan) in December 1991. Since then, he has contributed extensively on experimental kinetics of chemical reactions relevant to the atmosphere, first at Wayne State and then at the Jet Propulsion Laboratory (Pasadena, California). He then joined the faculty of University of Illinois at Urbana-Champaign (UIUC) in December 1995, and moved to California State University Fullerton (CSUF) in August 2003. His current primary research interests have been focused on detection and quantification of organic water contaminants in water using the FTIR-ATR technique, and the measurement of the rate coefficient and understanding the reaction mechanism of organic water contaminant removal using nano-technology.