

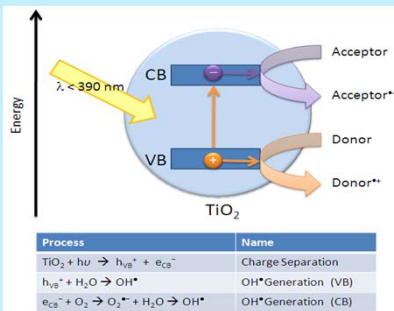
Advanced oxidation technologies and characteristic features of the hydroxyl radical

Introduction

Increased quantities of organics such as pesticides, pharmaceuticals, and other organic micropollutants can be found today in the aquatic environment and are of great concern in drinking water, wastewater, and water reuse applications. Therefore, the drinking water industry is continually challenged to provide its consumers water that is free from pollutants as well as microbial pathogens. In this concern, advanced oxidation processes (AOPs) have shown great potential in treating pollutants of low and high concentrations and have found applications as diverse as groundwater treatment, municipal wastewater sludge destruction and volatile organic compounds treatment and has future in swimming pool water treatment. This study considers semiconductor TiO_2 photoelectrocatalysis as the characteristic of high activity, good stability, non toxic and low cost and has become a hot topic in the field.

Why swimming pool water?

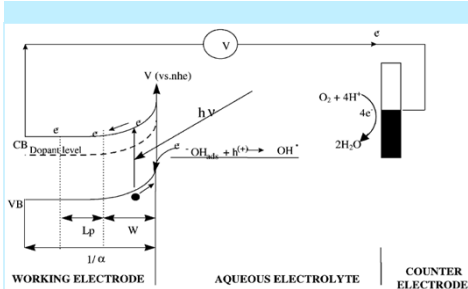
Given that the subject is extensive, the detailed research dealing with removal of all mentioned pollutants would present an overview of a great domain. Due to the complexity of swimming pool water chemistry, bacteriological and visual side, human exposure and potential health risks, present research will be dealing with swimming pool water as a representative model water and water which chemistry deals with the composition of the source water, the transformation of this water (e.g. disinfection processes) and the actions in the swimming pool (disinfection, swimmers, etc.).



Photocatalysis by TiO_2

Research objectives

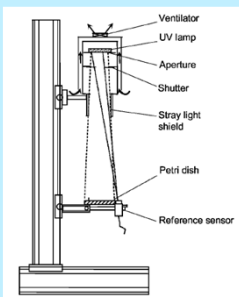
The aim of this work was to develop a new and original, integrated water treatment process, in which weak, and potentially negative, effect of one treatment step in the system is compensated by another treatment step, while retaining the strong aspects of each of these steps separately.



An energy diagram showing the principal of the enhanced photo-activity in photoelectrocatalysis

RESEARCH PLAN/CONCLUSION/SUMMARY

Research focuses on development of PEC reactor for water treatment process under optimal conditions to efficiently decrease contaminants and improve inactivation of microorganisms in complex water streams, as well as being cost effective and environmental cautious at the same time.



Schematic of a quasi collimated beam bench scale apparatus

