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*"Gheorghe Asachi" Technical University of Iasi, Romania*

# EFFECTS OF CHLORINE IONS ON THE PHOTOELECTRO-CATALYTIC DEGRADATION OF ORGANICS USING HIGHLY ORDERED $TiO_2$ NANOTUBE ARRAYS

**Jialing Zhang, Xuejin Li, Weiping Yin, Quanpeng Chen, Jinhua Li, Baoxue Zhou***

*School of Environmental Science and Engineering Shanghai Jiaotong University No. 800 Dongchuan Rd, Shanghai 200240, China*

## Abstract

As a new type of photoelectrocatalytic materials, the $TiO_2$ nanotube arrays have drawn a lot of attention for efficiently photoelectrocatalytic organic pollutants degradation due to their highly photoelectrocatalytic properties. Yet, the performance of photoelectrocatalytic organics degradation using $TiO_2$ nanotube arrays electrode is influenced by $Cl^-$, a kind of typical reducing material. This paper focuses on the effect of $Cl^-$ on the different photoelectrocatalytic performance of $TiO_2$ nanotube arrays electrode and $TiO_2$ nanoparticles film electrode as a comparison. Without organics, $Cl^-$ showed chemical inertness on the $TiO_2$ nanotube arrays electrode, different from the photocatalytic activity of $Cl^-$ on the $TiO_2$ nanoparticles film electrode. With organics, low concentration $Cl^-$ (0-100mg/L) hardly affected the organic degradation of $TiO_2$ nanotube arrays electrode, while high concentration $Cl^-$ (>100mg/L) obviously restrained it. The different performance between these two kinds of electrodes in photoelectrocatalytic organics degradation can be attributed to the peculiar architecture of $TiO_2$ nanotube arrays.

*Key words:* chloride, organics, photoelectrocatalytic degradation, $TiO_2$ nanotube

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* Author to whom all correspondence should be addressed: E-mail: zhoubaoxue@sjtu.edu.cn; Phone/fax: +86 21 5474 7351