



## Photocatalytic removal of Cr(VI) and Ni(II) by UV/TiO<sub>2</sub>: kinetic study

Mehdi Shirzad Siboni<sup>a</sup>, Mohammad-Taghi Samadi<sup>b</sup>, Jae-Kyu Yang<sup>c</sup>, Seung-Mok Lee<sup>d,\*</sup>

<sup>a</sup>*Environmental Health Research Centre, Kurdistan University of Medical Sciences, Kurdistan Sanandaj, Iran*

<sup>b</sup>*Department of Environmental Health, Hamadan University of Medical Science, Hamadan, Kurdistan Sanandaj, Iran*

<sup>c</sup>*Division of General Education, Kwangwoon University, Seoul, Korea*

<sup>d</sup>*Department of Environmental Engineering, Kwandong University, Gangnung, Korea*  
Tel. +82 33 649 7535; Fax: +82 33 642 7635; email: leesm@kd.ac.kr

Received 14 January 2011; Accepted 26 September 2011

---

### ABSTRACT

In this study, photocatalytic removal of Cr(VI) and Ni(II) by illuminated TiO<sub>2</sub> was investigated with variation of solution pH, contact time, TiO<sub>2</sub> dosage and initial Cr(VI) and Ni(II) concentration. From the photocatalytic reaction, near complete elimination of Cr(VI) and Ni(II) occurred from the adsorption of Cr(VI) and Ni(II) on the surface of TiO<sub>2</sub> as well as reduction of Cr(VI) and Ni(II) to Cr(III) and Ni(0), respectively. Reduction was recognized as a significant elimination process for the treatment Cr(VI) and Ni(II) from wastewater. Removal of Cr(VI) decreased with increasing pH while removal of Ni(II) increased with increasing pH. TiO<sub>2</sub> dosage was also an important parameter for the removal of Cr(VI). As the TiO<sub>2</sub> dosage increased up to 1 g l<sup>-1</sup>, removal of Cr(VI) and Ni(II) was continuously enhanced.

*Keywords:* Cr(VI); Ni(II); TiO<sub>2</sub>; Photocatalytic reduction; Adsorption; Kinetic

---

\*Corresponding author.