



Electrochemical oxidation of iodinated X-ray contrast media by boron-doped diamond electrodes

A.-L. Schneider^a, S. Tisler^a, H. Schell^a, T. Matthée^b, B. Behrendt-Fryda^b, A. Tiehm^{a,*}

^aDepartment of Environmental Biotechnology, DVGW-Technologiezentrum Wasser, Karlsruher Strasse 84, 76139 Karlsruhe, Germany, Tel. +49 721 9678 137; emails: andreas.tiehm@tzw.de (A. Tiehm), anna-lena.schneider@tzw.de (A.-L. Schneider), heico.schell@tzw.de (H. Schell)

^bCONDIAS GmbH, Fraunhofer Strasse 1b, 25524 Itzehoe, Germany, Tel. +49 4821 80 40 87 0; emails: matthee@condias.de (T. Matthée), behrendt@condias.de (B. Behrendt-Fryda)

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ABSTRACT

Iodinated X-ray contrast media (IXCM) represent widespread water pollutants due to their poor elimination by common wastewater treatment techniques such as aerobic and anaerobic biodegradation. In this study, we demonstrate the removal of six IXCM (iotalamic acid, iopamidol, iohexol, iopromide, iomeprol and diatrizoate) by electrochemical treatment with boron-doped diamond electrodes. Experiments were performed with model solutions and field water samples. Electrochemical treatment of IXCM in synthetic solution resulted in complete deiodination and generation of the oxidation product iodate. We observed a dissolved organic carbon (DOC) decrease of 30%–80% in IXCM solutions, indicating partial mineralisation. Electrochemical IXCM degradation followed pseudo-first-order kinetics. In experiments with surface water and effluent from a wastewater treatment plant, successful degradation of IXCM was achieved despite the high DOC background. These results demonstrate that electrochemical treatment is a promising method for IXCM removal. Further studies into biodegradation of transformation products are recommended.

Keywords: Electrochemical oxidation; Iodinated X-ray contrast media; Boron-doped diamond electrodes

* Corresponding author.

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