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Authors: Niels Wardenier, Patrick Vanraes, Anton Nikiforov, Stijn W.H. Van Hulle, Christophe Leys



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Removal of micropollutants from water in a continuous-flow electrical discharge reactor

Niels Wardenier^{1,2}, Patrick Vanraes^{3,1}, Anton Nikiforov¹, Stijn W.H. Van Hulle²,
Christophe Leys¹

¹RUPT, Department of Applied Physics, Ghent University, Sint-Pietersnieuwstraat 41 B4, 9000 Ghent, Belgium

²LIWET, Department of Green Chemistry & Technology, Ghent University, Graaf Karel de Goedelaan 5, 8500 Kortrijk, Belgium

³PLASMANT, Department of Chemistry, University of Antwerp Campus Drie Eiken, Universiteitsplein 1, 2610 Wilrijk-Antwerp, Belgium

*Corresponding author. tel: +32472615142 ; email: niels.wardenier@ugent.be; address: RUPT, Department of Applied Physics, Ghent University, Sint-Pietersnieuwstraat 41 B4, 9000 Ghent, Belgium

Highlights

- Micropollutant removal is studied in a continuous-flow DBD reactor
- The influence of 4 operational parameters is studied
- Under optimal operational settings > 93 % of micropollutants are removed
- Energy efficiency is in the range 2.42 – 4.25 kWh/m³ for all micropollutants evaluated

Abstract

The emergence of micropollutants into our aquatic resources is regarded as an issue of increasing environmental concern. To protect the aquatic environment against further contamination with micropollutants, treatment with advanced oxidation processes (AOPs) is put forward as a promising technique. In this work, an innovative AOP based on electrical discharges in a continuous-flow pulsed dielectric barrier discharge (DBD) reactor with falling water film over activated carbon textile is examined for its potential application in water treatment. The effect of various operational parameters including feed gas type, gas flow rate, water flow rate and power on removal and energy efficiency has been studied. To this end, a synthetic micropollutant mixture containing five pesticides (atrazine, alachlor, diuron, dichlorvos and pentachlorophenol), two pharmaceuticals (carbamazepine and 1,7- α -

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