

EDITORIAL

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The rapidly growing role of UV-AOPs in the production of safe drinking water

Stuart J. Khan,* Graham A. Gagnon,
Michael R. Templeton and Dionysios D. Dionysiou

Guest editors Stuart Khan, Graham Gagnon, Michael Templeton and Dionysios (Dion) Dionysiou introduce the Ultraviolet-based advanced oxidation processes (UV-AOPs) themed issue of *Environmental Science: Water Research & Technology*.

COMMUNICATION

1213

Cyto- and geno-toxicity of 1,4-dioxane and its transformation products during ultraviolet-driven advanced oxidation processes

Wei Li, Elvis Xu, Daniel Schlenk and Haizhou Liu*

Ultraviolet-driven advanced oxidation processes (UV/AOPs) are integral steps in water reuse treatment trains.

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Emerging investigators series: comparative study of naproxen degradation by the UV/chlorine and the UV/H₂O₂ advanced oxidation processes

Mingwei Pan, Zihao Wu, Changyuan Tang, Kaiheng Guo, Yingjie Cao and Jingyun Fang*

The UV/chlorine and UV/H₂O₂ AOPs on the degradation of naproxen were compared. The efficiency of naproxen was much higher by UV/chlorine compared to UV/H₂O₂ under all the tested conditions. ClO[•] and CO₃^{•-} played important roles in the degradation of naproxen.

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Emerging investigators series: ultraviolet and free chlorine aqueous-phase advanced oxidation process: kinetic simulations and experimental validation

Divya Kamath and Daisuke Minakata*

An elementary reaction based kinetic model was developed for the fate of acetone degradation in UV/free chlorine advanced oxidation process.

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Elimination of transforming activity and gene degradation during UV and UV/H₂O₂ treatment of plasmid-encoded antibiotic resistance genes

Younggun Yoon, Michael C. Dodd and Yunho Lee*

This study determined deactivation of transforming activity of an ARG and the ARG degradation during UV and UV/H₂O₂ treatment of plasmid pUC19 containing an ampicillin resistance gene.

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Potential formation of mutagenicity by low pressure-UV/H₂O₂ during the treatment of nitrate-rich source waters

S. Semitsoglou-Tsiapou,* M. R. Templeton, N. J. D. Graham, S. Mandal, L. Hernández Leal and J. C. Kruithof

LP-UV/H₂O₂ treatment of NOM-containing synthetic waters led to nitrite, nitrophenol and measurable but not mutagenic Ames responses in the presence of nitrate, where the NOM type affected the response levels.

1262

Photo-oxidation of 11-nor-9-carboxy- Δ^9 -tetrahydrocannabinol using medium-pressure UV and UV/H₂O₂ – a kinetic study

Yuri Park, Allison L. Mackie, Sean A. MacIsaac and Graham A. Gagnon*

Direct UV photolysis is the primary contributor to the degradation of THC-COOH in an aqueous solution.

1272

Efficient degradation of cytotoxic contaminants of emerging concern by UV/H₂O₂

Ying Huang, Yiqing Liu, Minghao Kong, Elvis Genbo Xu, Scott Coffin, Daniel Schlenk and Dionysios D. Dionysiou*

The degradation kinetics and cytotoxicity of two commonly detected contaminants of emerging concern (CECs), diclofenac and triclosan, in UV/H₂O₂ system were investigated in this study.

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Degradation of 1H-benzotriazole by UV/H₂O₂ and UV/TiO₂: kinetics, mechanisms, products and toxicology

Ya Chen, Jinshao Ye, Chongshu Li, Pulin Zhou, Juan Liu and Huase Ou*

Benzotriazoles are emerging contaminants widespread in environmental waters.

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The fate of dichloroacetonitrile in UV/Cl₂ and UV/H₂O₂ processes: implications on potable water reuse

Ran Yin,* Zhuozhi Zhong, Li Ling* and Chii Shang

The findings have important implications for the control of preformed DBPs by subsequent UV-AOPs for potable water reuse.

1303

Temperature dependence of the absorbance of 185 nm photons by water and commonly occurring solutes and its influence on the VUV advanced oxidation process

Adrian Serrano Mora* and Madjid Mohseni

185 nm absorption properties of water and common solutes within temperatures relevant to water treatment.

1310

Reaction rates and product formation during advanced oxidation of ionic liquid cations by UV/peroxide, UV/persulfate, and UV/chlorine

Sarah G. Pati and William A. Arnold*

Ionic liquid cations can be removed from contaminated source water by various UV-based advanced oxidation processes due to efficient reactions with hydroxyl and sulfate radicals.

1321

Improving UV/H₂O₂ performance following tertiary treatment of municipal wastewater

Sydney L. Ulliman, David B. Miklos, Uwe Hübner, Jörg E. Drewes and Karl G. Linden*

The ability of UV/AOP to treat trace organic contaminants (TOCs) in wastewater is inhibited by (1) UV light-absorbing species and (2) hydroxyl radical ([•]OH) scavenging species.

1331

Biofouling control by UV/H₂O₂ pretreatment for brackish water reverse osmosis process

Anat Lakretz, Hadas Mamane,* Eli Asa, Tali Harif and Moshe Herzberg*

UV applied with H₂O₂ is a well-known advanced oxidation process (AOP) for degradation of trace organic compounds. In this study, the UV/H₂O₂ process was applied as a pre-treatment step to control reverse osmosis biofouling.

1345

Comparison of advanced oxidation processes in the decomposition of diuron and monuron – efficiency, intermediates, electrical energy per order and the effect of various matrices

János Farkas, Máté Náfrádi, Tamás Hlogyik, Bartus Cora Pravda, Krisztina Schrantz, Klára Hernádi and Tünde Alapi*

The efficiency of UV-photolysis, ozonation, their combination and heterogeneous photocatalysis was investigated and compared in various matrices.

1361

Solar photocatalysis with modified TiO₂ photocatalysts: effects on NOM and disinfection byproduct formation potential

Stephanie Gora,* Aleksandra Sokolowski, Melisa Hatat-Fraile, Robert Liang, Y. Norman Zhou and Susan Andrews

The overall reactivity of natural organic matter from river water towards chlorine was increased by solar TiO₂ treatment with TiO₂ nanomaterials modified with nitrogen, boron, or silver to improve their solar light utilization.