



International  
Water Association



International  
Ozone Association

Sponsors



Deutsche Bundesstiftung Umwelt



Degremont Technologies-Ozonie

WEDECO



[www.aop-conferences.de](http://www.aop-conferences.de)

Organisers

CU.....  
**TEC**



WASSER  
BERLIN



E **OA<sup>3</sup>G**

# Programme

5<sup>th</sup> IWA Specialist Conference / 10<sup>th</sup> IOA-EA<sub>3</sub>G Berlin Conference

## Oxidation Technologies for Water and Wastewater Treatment



March 30 – April 2 2009





**IWA**  
International  
Water Association



**IOA<sub>3</sub>G**  
International  
Ozone Association

# BERLIN

5<sup>th</sup> IWA Specialist Conference / 10<sup>th</sup> IOA-EA<sub>3</sub>G Berlin Conference

## Oxidation Technologies for Water and Wastewater Treatment

⌚ Sunday, 29.03.2009

- From 19:00      Get-Together  
Filmbühne am Steinplatz, Hardenbergstraße 12,  
10623 Berlin-Charlottenburg



⌚ Monday, 30.03.2009

- From 9:00      Exhibition opening "WASSER Berlin"  
Opportunity to visit the "WASSER Berlin"  
10:00 – 11:00    Registration at the conference desk by the entrance of the room "Paris"  
11:00 – 12:00    Meeting of IWA-Specialist group AOP / Joint meeting with IOA  
13:30 – 14:00    Refreshments  
sponsored by Degrémont Technologies-Ozonie,  
Schwitzerland  
14:00 – 14:20    Welcome, introduction and opening



### RECYCLING / REUSE

Chair: **A. Ried**, ITT WEDECO GmbH, Germany

- 14:20 – 14:40    Advanced oxidation and artificial recharge: a synergistic hybrid system  
for removal of organic micropollutants  
**K. Teunissen**, Duinwaterbedrijf Zuid-Holland/Delft University  
of Technology, The Netherlands  
14:40 – 15:00    Advanced oxidation for indirect potable reuse – A practical  
application in Australia  
**Y. Poussade**, Veolia Water Australia, Australia

- 15:00 – 15:20    1<sup>st</sup> Poster introduction: Fundamentals  
15:20 – 16:00    Coffee break, poster presentation & exhibition

Chair: **M. Jekel**, Technische Universität Berlin, Germany

- 16:00 – 16:20    The use of E. Beam for the removal of recalcitrant compounds:  
The interesting effect of chemicals introduction  
**N. Karpel Vel Leitner**, CNRS-University of Poitiers, France  
16:20 – 16:40    Water-reuse with ozone as an oxidant – A review about  
technical applications  
**S. Schäfer**, CUTEC-Institut GmbH, Germany  
16:40 – 17:00    Ultrasound-aided Ozonation of effluents from wastewater treatment plants  
for disinfection, degradation of endocrine disrupting compounds (EDCs) and  
enhancement of the aerobic degradation processes in biological reactors  
**C. Oliveri**, Ultrasonic Systems GmbH, Germany





Chair: **M. Sievers**, CUTEC-Institut GmbH, Germany

17:00 – 17:50 Industrial session/Short exhibitor presentations

- UV-Consulting Peschl. e. K., Germany
- Praxair Deutschland GmbH & Co. KG, Germany
- a.c.k. aqua concept GmbH, Germany
- VTU Technology GmbH, Austria
- Ultrasonic Systems GmbH, Germany

Followed by Draft beer & pretzel at the joint CUTEC/AOP5 stand, hall 6.2B / stand 410  
sponsored by ITT WEDECO GmbH, Germany



⇒ **Tuesday, 31.03.2009**

### DRINKING WATER

Chair: **J.-P. Duguet**, Eau de Paris (SAGEP), France

09:00 – 9:20 Bromate pre-systemic detoxification metabolism research progress

**J. Cotruvo**, Joseph Cotruvo & Associates LLC, U.S.A.

09:20 – 9:40 Elimination of taste and odor compounds and bromate formation during ozonation and the AOP  $O_3/H_2O_2$

**H. Lutze**, University of Duisburg-Essen, Germany

09:40 – 10:00 Full scale advanced oxidation treatment plant for groundwater

**M. Werderitsch**, Vienna Waterworks, Austria

10:00 – 10:20 2<sup>nd</sup> Poster introduction: Fenton/Electro-Fenton Electro-Oxidation

10:20 – 11:00 Coffee break, poster presentation & exhibition

Chair: **Z. Do-Quang**, Cirsee-Suez Environnement, France

11:00 – 11:20 “Ozone” and “GAC Filtration” synergy for emerging micropollutants removal on drinking water treatment plant?

**C. Boucherie**, Veolia Eau, Immeuble Le Carillon, France

11:20 – 11:40 Evaluation of pilot-scale oxidation of several PPCPs/ EDCs during drinking water ozonation treatment

**R. Seth**, University of Windsor, Canada

11:40 – 12:00 A modelling procedure for on-site oxidation steps in potable water treatment

**P. Mandel**, Anjou Recherche – Véolia Environnement/ENSCR, France

12:00 – 12:20 3<sup>rd</sup> Poster introduction: Catalysts and Photocatalysis

12:20 – 14:00 Lunch, poster presentation & exhibition

### WASTEWATER

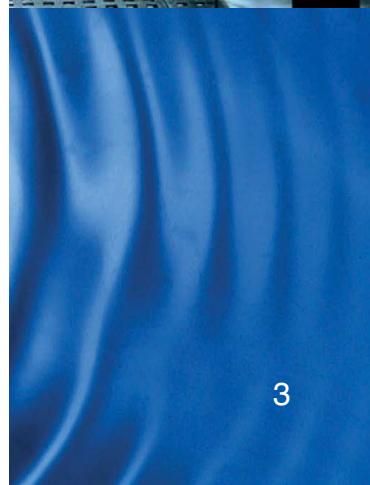
Chair: **H. Suty**, Anjou Recherche, France

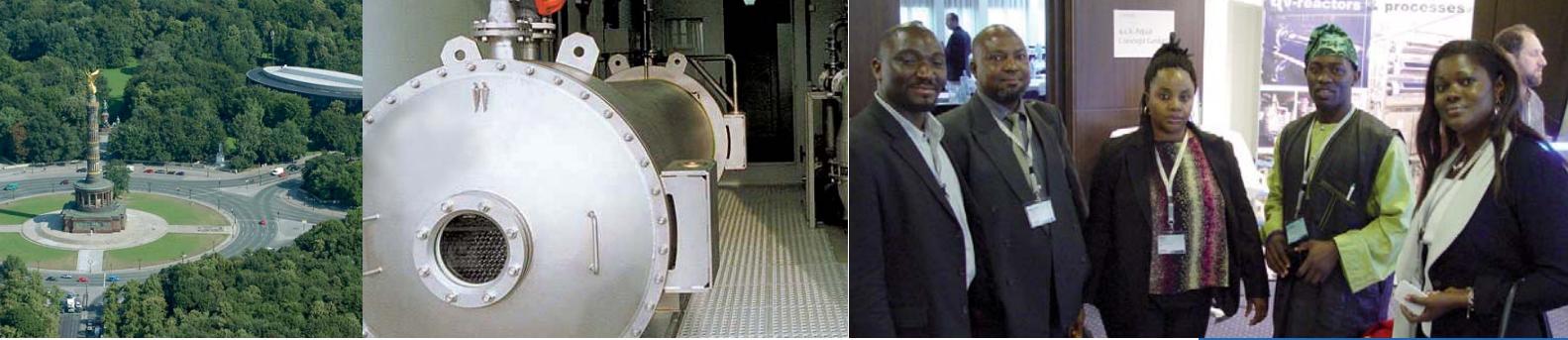
14:00 – 14:20 Ozonation and AOPs for oil shale industry's wastewater treatment: an overview

**M. Trapido**, Tallinn University of Technology, Estonia

14:20 – 14:40 Integration between chemical oxidation and membrane thermophilic biological process

**G. Bertanza**, Università di Brescia, Italia





14:40 – 15:00      Toxicity and recalcitrant compounds removal of bleaching pulp mill by integrated system: anaerobic packed-bed bioreactor and ozone  
*T. Chaparro, University of São Paulo, Brazil*

15:00 – 15:20      4<sup>th</sup> Poster introduction: PPCP/EDC and Disinfection  
15:20 – 16:00      Coffee break, poster presentation & exhibition

### **SLUDGE**

Chair:                  *S. Baig, Degrémont Technologies, France*

16:00 – 16:20      Wet air oxidation of municipal sludge: Return experience of the Brussels-North WWTP

*J. Chauzy, Veolia Water, France*

16:20 – 16:40      Full scale application of a novel sludge ozonation process for achieving up to 80% excess sludge reduction at a 25,000 m<sup>3</sup>/day municipal wastewater plant

*P. Wrampe/G. Raugust, Praxair Deutschland GmbH & Co. KG, Germany*

16:40 – 17:00      Effect of ozone pre-treatment on sludge production of aerobic digestion processes

*F. Al Momani, Mutah University, Jordan*

17:00 – 17:20      5<sup>th</sup> Poster introduction: Ozone/AOP/Water/Wastewater and Sludge

From 19:00            Dinner

### **⌚ Wednesday, 01.04.2009**

### **FENTON**

Chair:                  *G. Bertanza, University of Brescia, Italy*

9:00 – 9:20      Acid dye manufacturing wastewater treatment with fenton's reagent and electrocoagulation: process modelling, optimization and effects on activated sludge inhibition

*I. Arslan-Alaton, Istanbul Technical University, Turkey*

9:20 – 9:40      Application of nanoscaled iron reduction followed by UV/H<sub>2</sub>O<sub>2</sub> oxidation for degradation of azo dye in wastewater

*H.-Y. Shu, Hungkuang University, Taiwan, R.o.C.*

9:40 – 10:00      New insights in the dihydroxybenzenes-Driven Fenton Reaction: Electrochemical study of interaction between dihydroxybenzenes and Fe(III)

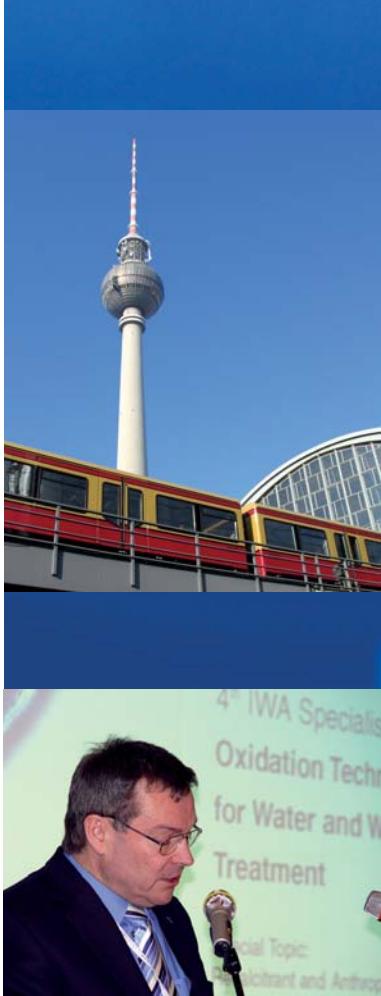
*J. Rodriguez, University of Concepción, Chile*

10:00 – 10:20      Oxidation of cosmetic wastewaters with H<sub>2</sub>O<sub>2</sub> using a Fe/γ-Al<sub>2</sub>O<sub>3</sub> catalyst  
*J. J. Rodriguez Jiménez, Universidad Autónoma de Madrid, Spain*

10:20 – 11:00      Coffee break, poster presentation & exhibition sponsored by Anseros GmbH, Germany



11:00 – 11:20      Fe(III)/Photocatalytic removal of bisphenol A from water  
*P. M. Alvarez, Universidad de Extremadura, Spain*





- 11:20 – 11:40 Treatment of humic substances by potassium ferrate:  
Oxidation and coagulation interactions  
**N. Graham**, Imperial College London, UK

### **ELECTRO-CHEMISTRY**

- Chair: **C. von Sonntag**, Max Planck Institut für Bioanorganische Chemie/Universität Dortmund, Germany

- 11:40 – 12:00 The advanced EctoSys electrolysis as an integral part of a ballast water treatment system  
**A. Kornmüller**, RWO GmbH – Marine Water Technology, Veolia Water Solutions & Technologies, Germany
- 12:00 – 12:20 The effect of electrode material on the generation of oxidants for the electrochemical disinfection  
**J. Yoon**, Seoul National University, Korea
- 12:20 – 12:40 Chlorate and perchlorate – new criterions for environmentally-friendly processes in advanced oxidation  
**M. E. H. Bergmann**, Anhalt University, Germany
- 12:40 – 14:10 Lunch, poster presentation & exhibition



### **TRACE-POLLUTANTS (PART 1)**

- Chair: **S. Esplugas**, Universidad de Barcelona, Spain

- 14:10 – 14:30 Ozonation of beta blockers: Kinetic studies and identification of oxidation products  
**J. Benner**, Federal Institute of Hydrology, Germany
- 14:30 – 14:50 Effects of pH and H<sub>2</sub>O<sub>2</sub> on levofloxacin ozonation in water  
**B. De Witte**, Ghent University, Belgium
- 14:50 – 15:10 Efficient degradation of ketoprofen: UV and VUV photolysis versus ozonization  
**K. Gajda-Schrantz**, University of Szeged, Hungary
- 15:10 – 15:30 Behaviour and transformation of sulfamethoxazole after ozonation in secondary effluent and reverse osmosis concentrate  
**A. Hein**, Technical University of Berlin, Germany

- 15:30 – 16:10 Coffee break, poster presentation & exhibition



### **PHOTOCATALYSIS (PART 1)**

- Chair: **D. Bahnemann**, University of Hanover, Germany

- 16:10 – 16:30 Solar aqueous photocatalysis for pharmaceuticals removal in a pilot plant  
**F. Méndez-Arriaga**, University of Barcelona, Spain
- 16:30 – 16:50 Kinetic modelling of the photocatalytic inactivation of bacteria  
**J. Marugán**, Universidad Rey Juan Carlos, Spain
- 16:50 – 17:10 Reactor modeling in heterogeneous photocatalysis.  
Toxicity and biodegradability assessment  
**O. M. Alfano**, Universidad Nacional del Litoral and CONICET, Argentina

- From 19:00 Dinner





⇒ Thursday, 02.04.2009

### PHOTOCATALYSIS (PART 2)

Chair: *P. Pichat, URA au CNRS, Ecole Centrale de Lyon, France*

- 09:00 – 09:20 Effect of adsorption on photocatalysis performance of anthraquinone dye  
*M. Ismail, ENSIC-INPL Nancy, France*
- 09:20 – 09:40 Synthesis and photocatalytic activity of boron-doped TiO<sub>2</sub> in aqueous suspensions under UV-A irradiation  
*N. P. Xekoukoulotakis, Technical University of Crete, Greece*
- 09:40 – 10:00 Degradation of azo dye using a novel TiO<sub>2</sub>/Fe<sup>0</sup> composite nanoparticles  
*W.-P. Hsieh, National Chiao Tung University, Taiwan*
- 10:00 – 10:20 Tetracycline oxidation by ZnO photocatalysis assisted by simulated solar light  
*H. D. Mansilla, University of Concepción, Chile*

### TRACE-POLLUTANTS (PART 2)

Chair: *T. Ternes, Federal Institute of Hydrology, Germany*

- 10:20 – 10:40 Full scale post-ozoneation followed by sand filtration at WWTP Regensdorf (CH) for micropollutant removal and disinfection  
*H. Siegrist, EAWAG, Switzerland*
- 10:40 – 11:20 Coffee break, poster presentation & exhibition
- 11:20 – 11:40 Physicochemical and advanced oxidation processes – A comparison of elimination results of antibiotic compounds followed an MBR treatment  
*H. Schröder, RWTH Aachen University, Germany*
- 11:40 – 12:00 Advances in catalyzed ozonation for degradation of organic pollutants and full scale applications  
*J. Ma, Harbin Institute of Technology, China*
- 12:00 – 12:20 Computer-assisted determination of reaction parameters for the simulation of micropollutant abatement in wastewater ozonation  
*T. Nöthe, Uhde GmbH/Technische Universität Dortmund, Germany*
- 12:20 – 12:40 Removal of analgesic drugs from the aquatic environment using photochemical methods  
*E. Felis, Silesian University of Technology, Poland*
- 12:40 – 13:00 Removal of carbamazepine upon sulphate radical oxidation from urban wastewater  
*S. Barbat, Aix-Marseille Universités, France*
- 13:00 Conclusion and farewell  
*M. Sievers, CUTEC-Institut GmbH, Germany*
- Followed by Lunch





## ⇒ Scientific Committee

- Prof. Dr. O. Alfano, INTEC, Santa Fe, Argentina
- Prof. Dr. D. Bahnemann, University of Hanover, Germany
- Dr. S. Baig, Degrémont, France
- Prof. M. Bekbölet, Bogazici University, Istanbul, Turkey
- Prof. Dr. G. Bertanza, University of Brescia, Italy
- Dr. L. Bousselmi, INRST, Hammam Lif, Tunisia
- Dr. P. Breant, Anjou Recherche, France
- Dr. Z. Do-Quang, Cirsee - Suez Environnement, France
- Dr. J. P. Duguet, EAU DE PARIS (Sagep), France
- Prof. Dr. S. Esplugas, Universidad de Barcelona, Spain
- Dr. M. Fabiyi, Praxair Inc., USA
- Prof. Dr. S.-U. Geißen, Technische Universität Berlin, Germany
- Prof. N. Graham, Imperial College London, UK
- Prof. M. Hoffmann, Caltech, Pasadena, USA
- Prof. Dr. M. Jekel, Technische Universität Berlin, Germany
- P.-A. Liechti, Degrémont Technologies Ozonia Ltd, Dübendorf, Switzerland
- Prof. M.-C. Lu, Chia Nan University of Pharmacy and Science, Taiwan
- Dr. H. Mansilla, Universidad de Concepcion, Chile
- Prof. Dr. K. Miksch, University of Gliwice, Poland
- Prof. Dr. R. Munter, Tallinn Technical University, Estonia
- Prof. K. Nonnenmacher, Anseros GmbH, Tübingen, Germany
- Prof. Dr. E. Oliveros, University of Karlsruhe, Germany
- Prof. Dr. P. Pichat, URA au CNRS, Ecole Centrale de Lyon, Ecully, France
- Prof. Dr. S. Preis, Lappeenranta University of Technology, Finland
- Dr. A. Ried, ITT Wedeco, Herford, Germany
- Dr. J. Rodriguez, Universidad de Concepcion, Chile
- Prof. Dr. M. Sievers, CUTEC-Institut, Clausthal, Germany
- H. Suty, Anjou Recherche, Maisons-Laffitte Cedex, France
- Prof. Dr. M. Roustan, INSA - Dept. GPI, France
- Dr. T. Ternes, Federal Institute of Hydrology, Koblenz, Germany
- Prof. Dr. J. Yoon, Seoul National University, South Korea
- Prof. Dr. P. L. Yue, The Hong Kong University of Science & Technology, China



## ⇒ Conference Organising Team

- Prof. Dr.-Ing. M. Sievers, CUTEC-Institut, Clausthal, Germany
- Prof. Dr.-Ing. S.-U. Geißen, Technical University of Berlin, Germany
- Dr.-Ing. B. Kragert, CUTEC-Institut, Clausthal, Germany
- Dr.-Ing. T. I. Onyeche, CUTEC-Institut, Clausthal, Germany
- Dipl.-Ing. S. Schäfer, CUTEC-Institut, Clausthal, Germany



## Information

### SCOPE OF THE CONFERENCE

This conference is one of the very successful International Conference Series and serves to discuss and promote Advanced Oxidation Processes (AOPs) in the field of water, wastewater, groundwater and potable water treatment.

The Scientific Committee evaluated more than 250 submitted abstracts. The more than 150 posters and the 43 oral presentations selected will be an excellent platform for interesting discussions and contacts.

### PUBLICATION

Conference Proceedings and Book of Abstracts are available. Contributions selected in a review process by the Scientific Committee will be published in selected journals.

### CO-SPONSORSHIP

International Water Association (IWA), London, UK, and International Ozone Association (IOA), Scottsdale, U.S.A. This conference will be promoted by the IWA Specialist Group "Advanced Oxidation Processes" (AOP).

### SPONSORING

Sponsoring will be given by the companies:  
Degrémont Technologies-Ozonia, Dübendorf, Switzerland,  
Wedeco ITT, Herford, Germany and  
Ansersos GmbH, Tübingen, Germany.

### FINANCIAL SUPPORT

Support for participants from low-income countries is given by the Deutsche Bundesstiftung Umwelt, Osnabrück, Germany.

### VENUE

The conference will be held in Berlin at Messe Berlin, Exhibition Grounds, hall 7, congress room "Paris".

### ACCOMMODATION

For hotel booking:

[www.aop-conferences.de/accommodation.html](http://www.aop-conferences.de/accommodation.html)  
[www.visitberlin.de/english/suchen-buchen/index.php](http://www.visitberlin.de/english/suchen-buchen/index.php)  
[www.smartfairs.de](http://www.smartfairs.de)

### EXHIBITION

The conference will be held in conjunction with exhibition WASSER BERLIN (approx. 500 exhibitors and 25,000 visitors).

### KEY DATES

Conference: March 30 – April 2 2009  
Exhibition Wasser Berlin: March 30 – April 3 2009

### REGISTRATION FEE

Non-members	560.- EURO
IWA and IOA members	450.- EURO
Speakers (paper and poster)	470.- EURO
Day ticket	260.- EURO

### Conference website and Registration

<http://www.aop-conferences.de>

### CONFERENCE OFFICE

All correspondence related to registration and organisation should be directed to:

#### CUTEC-Institut GmbH

Prof. Dr.-Ing. M. Sievers

Leibnizstrasse 21 + 23

D-38678 Clausthal-Zellerfeld, Germany

Phone + 49 5323 / 9 33-243

Fax + 49 5323 / 933-100

E-Mail: [aop5@cutec.de](mailto:aop5@cutec.de)

[www.aop-conferences.de](http://www.aop-conferences.de)

### Survey of halls

WASSER BERLIN  
30. März – 3. April 2009

