

# Newsletter 04

<http://www.u-bourgogne.fr/ACE>

## European Association of Chemistry and the Environment

March 2003

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### 1. EDITORIAL

The ACE board would like to extend a warm welcome to all association members and first time readers of the newsletter. Newsletters of the Association of Chemistry and the Environment will now be published within each issue of the ECL journal, providing more regular information updates and giving members more opportunity to contribute throughout the year. The newsletter is widely acclaimed as a wonderful way of keeping in touch with the news and research developments of ACE members - a deliberately rather informal overview that bridges the gap between the annual December meetings of the Association. The style of the newsletter reflects the friendly nature and colourful mix of applications that promotes new ideas and opens new avenues of research and collaborations between ACE members.



**Dr. Stephanie N. Dudd**  
Newsletter Editor-in-chief

### 2. MESSAGE FROM THE CHAIRPERSON

Dear Colleague,

Founded in October 2000, by a friendly group of European Scientists, our association has already seen the realisation of many highly significant events and projects at the interface of geology, chemistry, biology and physics. Highly successful *European Meetings on Environmental Chemistry* (EMEC) have been held in Nancy, France (2000), Dijon, France (2001) and Geneva, Switzerland (2002), with around 300 attendees from around the globe, who came to discuss their findings, to arrange future collaborations, e.g. European projects, and to discuss employment opportunities. Future meetings are already planned in Plymouth, England (2003), Bari, Italy (2004), Belgrade, Yugoslavia (2005) and Brno, Czech Republic (2006).

Additionally, in resolutely striving to recognise and promote the contribution of our young colleagues, we have established two ACE awards: the *Environmental Chemistry Award*, that is presented to the best young author of a poster at annual ACE meetings, and the Young Researcher of the Year Award, which annually recognises the outstanding achievements of a young scientist. The activities of the ACE also extend to helping young scientists to embark on rewarding and successful career paths, by maintaining and promoting a database of employment opportunities.

Our activities have extended to setting up a highly acclaimed collaboration network database (CND), formulated to foster research collaboration among academic, government and industrial scientists, further details of which can be obtained on the ACE web site: (<http://www.u-bourgogne.fr/ACE>), and a book entitled *Environmental Chemistry*, including around 80 articles from the Dijon 2001 meeting will be published soon by the publisher Springer-Verlag (Heidelberg). The Association and Springer-Verlag have also collectively established the novel International journal, *Environmental Chemistry Letters* (ECL), which will exclusively publish articles relating exceptional findings at the interface of geology, chemistry, biology and physics. The purpose of the journal style is to provide a rapid turn around time for the publication of notable research papers. It is worth noting that the ACE membership fee of only 50 Euros includes the receipt

**EDITOR-IN-CHIEF:**  
DUDD Stephanie N.

**ASSOCIATE-EDITOR:**  
LICHTFOUSE Eric

**ART-EDITOR:**  
ELBISSER Brigitte



of hard copy issues of *Environmental Chemistry Letters*. Finally, and as a result of the valuable contributions received from members of the Association, you are now enjoying the fourth issue of the ACE Newsletter.

Due to the substantial efforts and enthusiasm of the executive and advisory boards, and of course its members, the European Association of Chemistry and the Environment has achieved a great deal in the first 3 years of existence. Therefore, I wish to thank you very much for your contribution to the success of the association. Please do not hesitate to contact myself or other board members for more information and assistance.

Yours,  
Dr. Eric Lichtfouse



### 3. 2002 ACE YOUNG RESEARCHER OF THE YEAR AWARD

The 2002 award was presented at the December meeting of the Association to **Christel S. Hassler**, a Swiss student from the Analytical and Biophysical Environmental Chemistry Group (CABE), University of Geneva.

Christel graduated in 1995 with a Degree in biology from the University of Geneva and continued with a Diploma in natural environmental sciences, encompassing a 2-year practicum on the influences of physicochemical parameters on the toxicity of chemicals on freshwater algae. Between 2001 and 2002 she worked towards a certificate of specialization in microbiology and parasitology in a collaborative project between the University of Geneva and the Bacteriological Institute of Lugano. Christel's recent studies have been towards a multidisciplinary Ph.D. in environmental sciences entitled "Chemical and biological aspects of zinc bioaccumulation by a green algae (*Chlorella kesslerii*)" within the University of Geneva, Analytical and Biophysical Environmental Chemistry Group (CABE).

Christel writes... "My main interest is to better understand the interactions and impact of chemical and biological substances on living organisms in natural waters. After focusing on microscale lab studies during my Ph. D, I have realized that such findings, even if extremely useful for improving fundamental understandings, are difficult to transpose in natural environments. Therefore, I am especially interested in integrating a micro-scale analysis of natural samples with field observations in order to obtain a truly relevant, global, environmental perspective".



Christel is pictured (far left) with fellow members of her research group

Christel has provided the following article to summarise the research activities of her group.

#### Determination of some of the physico-chemical factors regulating trace metal accumulation by microorganisms

Christel S. Hassler, Heliana Kola, Cristina Lamellas, Alain Reinhardt, Dana Simon, Vera I. Slaveykova, Marco Tuveri, Isabelle Worms and Kevin J. Wilkinson\*

\*Correspondence: **K.J. Wilkinson**;  
Analytical and Biophysical Environmental Chemistry Group (CABE), University of Geneva (Sciences II), 30 Quai Ernest Ansermet, 1211 Geneva 4, Switzerland  
Kevin.Wilkinson@cabe.unige.ch;  
Website: [www.unige.ch/cabe/wilkinson](http://www.unige.ch/cabe/wilkinson)

The Analytical and Biophysical Environmental Chemistry Group (CABE) is examining environmental microstructures and microprocesses (nanometer to centimeter range) in order to better understand macroscopic structures and the behaviour of environmental systems. In this respect, research is performed, both in laboratory and in situ, on dynamic processes related to physical and colloid chemistry, biochemistry and biophysics. Because most trace compounds are associated with natural colloids, including inorganic solids (e.g. clay particles) and biopolymers (e.g. polysaccharides, humic compounds), some studies are related to the characterisation of these colloids, their interactions, and the nature of the environmental structures that they form. Furthermore new analytical methods are being developed in order to monitor key environmental parameters that will allow us to better understand environmental systems. This includes the development of bioanalytic (micro)sensors and analytical systems enabling the measurements of parameters directly related to ecotoxicity, as well as microgradients and fluxes in stratified or heterogeneous environmental systems (e.g. sediment-water interface, aggregates, biofilms). CABE consists of four sub-groups that each focus on one aspect of this broad problem:

- The development of analytical micro (sensors) and environmental in situ probes (Prof. J. Buffle)
- The experimental study of model colloidal microstructures and dynamic processes (Prof. M. Borkovec)
- The numerical modelling of environmental supramolecular structures and processes (Dr. S. Stoll)
- The study of natural microstructures and dynamic processes in relation to biouptake and pollutant transport (our sub-group: Dr. K.J. Wilkinson)

The goal of our sub-group is to contribute to the understanding of the mechanisms that control the transport and bioavailability of vital and detrimental elements and compounds in aquatic systems (water, sediments, soils). For example, our research team is currently working towards understanding the fundamental physicochemical mechanisms of trace metal biouptake by aquatic microorganisms in natural systems. Research is focused on identifying under what conditions uptake fluxes are limited by physical (e.g. diffusion), chemical (e.g. dissociation kinetics) or biological (e.g. transfer across biological membrane) processes [1-4]. An important long-term objective of this work is the identification of measurements that best



EUROPEAN  
YOUNG RESEARCHER  
OF THE YEAR

**Christel S. Hassler**,  
Analytical and Biophysical  
Environmental Chemistry Group,  
University of Geneva,  
Switzerland  
[Christel.Hassler@cabe.unige.ch](mailto:Christel.Hassler@cabe.unige.ch)

represent trace element "bioavailability" in natural systems. Because trace compounds are often associated with colloids and organic biopolymers, a related aspect of the work involves their characterization [5-10], including investigations of the mechanisms of interaction (bridging flocculation, heterocoagulation, etc.) [11-13]. Up-to-date information on CABE and our sub-group, including a complete and current publication list can be found at <http://www.unige.ch/cabe/wilkinson>.

- [1] Wilkinson K.J., Slaveykova V.I., Hassler C.S., and Rossier C. (2002). *Chimia*, In press.
- [2] Slaveykova V.I. and Wilkinson K.J. (2002). Physicochemistry of Pb accumulation by *Chlorella vulgaris*. *Envir. Sci. Technol.* **36**, 969.
- [3] Hassler C.S. and Wilkinson K.J. (2003). *Envir. Toxicol. Chem.* **22**, 620.
- [4] Mirimanoff N. and Wilkinson K.J. (2000). *Envir. Sci. Technol.* **34**, 616.
- [5] Balnois E., Wilkinson K.J., Lead J. and Buffle J. (1999). *Envir. Sci. Technol.* **33**, 3911.
- [6] Lead J., Wilkinson K.J., Starchev K., Canonica S. and Buffle J. (2000). *Envir. Sci. Technol.* **34**, 1365.
- [7] Balnois E., Stoll S., Wilkinson K.J., Buffle J., Rinaudo M. and Milas M. (2000). *Macromolecules* **33**, 7440.
- [8] Hosse M. and Wilkinson K.J. (2001). *Envir. Sci. Technol.* **35**, 4301.
- [9] Camensano, T. and Wilkinson, K.J. (2001). *Biomacromolecules* **2**, 1184.
- [10] Santschi P.H., Balnois E., Wilkinson K.J., Zhang J., Buffle J. and Guo L. (1998). *Limnol. Oceanogr.* **43**, 896.
- [11] Wilkinson K.J., Nègre J.C. and Buffle J. (1997). *J. Contamin. Hydrol.* **26**, 229.
- [12] Wilkinson K.J., Jozroland A. and Buffle J. (1997). *Limnol. Oceanogr.* **42**, 1714.
- [13] Buffle J., Wilkinson K.J., Stoll S., Filella M. and Zhang J. (1998). *Envir. Sci. Technol.* **32**, 2887.

#### 4. THE ACE ENVIRONMENTAL CHEMISTRY AWARD

This award is presented to author(s) of the best poster presentation at annual meetings of the Association. The award consists of a Daum artwork (value: 220 Euros), and in 2002 was presented to **Núria Fiol Santalò**, Maria Martinez, Jordi Poch, Joan Serarols and Isabel Villaescusa, for their presentation entitled "Vegetable wastes as low-cost sorbents for Cr(VI) uptake".



Eric Lichtfouse, Núria Fiol Santalò, Roland Kallenborn

**Núria Fiol Santalò**,  
Metals and Environment Laboratory,  
University of Girona, Spain  
[nuria.fiol@udg.es](mailto:nuria.fiol@udg.es)

#### 5. 2003 ACE YOUNG RESEARCHER OF THE YEAR

##### Call for candidates

Instructions for applicants for the 2003 Young Researcher award are now available on the ACE website:

<http://www.u-bourgogne.fr/ACE/>.

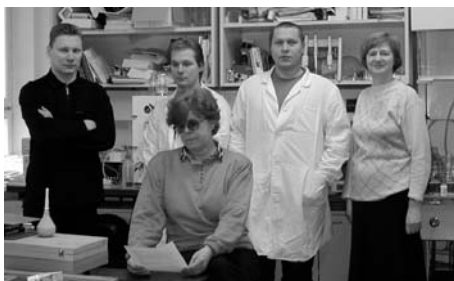
Jury members are now being sought for judging of the 2003 award; please apply to [ACE.news@totalise.co.uk](mailto:ACE.news@totalise.co.uk).

#### 6. INTRODUCTION TO THE ENVIRONMENTAL CHEMISTRY RESEARCH GROUP, NICB, ESTONIA.

**Uue Kirso**,

National Institute of Chemical Physics and Biophysics, Tallinn, Estonia

[uue@kbfi.ee](mailto:uue@kbfi.ee)



Members of the environmental chemistry research group, from left: Preet Alumaa (MS), Jörgen Slet, Erik Teinemaa (MS), Natalya Irha (PhD); sitting: Mrs. Pilvi Kerdi



The photograph illustrates the sorptometer that Uue's group use for BET analysis of particulate matter (adsorption isotherms, pore volume, pore distribution, specific surface area)

Representatives of the group presented the results of two studies at the EMEC3 meeting in December 2002, one of which looked at field-scale data on selected heavy metals (Cu, Pb, Cr, Zn and Cd) in different soil types in Estonia. The soil samples were taken from the humus horizon and pH values, surface area and distribution of pore volumes, content of organic matter and bulk chemical composition were characterised. The study found the mobility and bioavailability of heavy metals to be highly site specific.

A second area of study being carried out is concerned with the characterisation of oil shale ash - important in view of the potential applications of the ash particles. They have characterised particle morphology at different stages of oil shale combustion using NMR and BET analysis, revealing large variations in composition, surface area and total pore volume between ash particles originating from different stage of the combustion process.

## 7. ACCLAIMED FACILITIES FOR ENVIRONMENTAL RESEARCH

The Environmental Research Institute,  
Castle Street, Thurso, Caithness, Scotland  
www.ERlonline.co.uk

A highly successful partnership between the North Highland College, the University of the Highlands and Islands (UHI) Millennium Institute, Caithness and Sutherland Enterprise, and UKAEA, Dounreay, has resulted in the establishment of the Environmental Research Institute (ERI) in Thurso, Caithness. The ERI is a multifunctional research and educational facility, which opened in 1999, having attracted substantial funding from the European Regional Development fund and the Millennium Commission.

Current ERI research themes include: environmental and climatic change, marine and atmospheric sciences, natural products and pollution, waste and remediation. The facility actively collaborates with Universities and organisations throughout the UK and Europe, offering a range of amenities including conference facilities, educational services and a field centre that provides unrivalled access to the unique environment of the Highlands of Scotland.



Further information is available from  
**Dr. Stuart Gibb**  
Stuart.Gibb@thurso.uhi.ac.uk

## 8. GREETINGS FROM PROF. GHEORGHE DUCA, MINISTER

Ministry of Ecology, Construction and Territorial Development of the Republic of Moldova  
duca@mrda.md

Gheorghe Duca extends his greetings to scientists working in the field of environmental chemistry and invites readers to visit the website (<http://www.mrda.md/ecochem.php>) of the Second International Conference on Ecological Chemistry, which took place in Chisinau, Moldova, October 11-12, 2002. It integrated different areas of science and technology in order to discuss the main problems of assessment, development and protection of our environment and to produce scientifically sound decision-making tools. The Second Conference on Ecological Chemistry served as an important event at both the national and international level and showcased the latest achievements in the realm of ecological chemistry.

The conference resolution page of the website lays out the recommendations and proposals resulting from the meeting. The two successful symposia that have so far taken place have served to initiate the formation and development of research schools and scientific research in ecological chemistry not only in Moldova but in a number of other countries. Gheorghe Duca encourages readers to visit the web pages of the Moldovan Research and Development Association, in order to promote interest in the scientific endeavours and challenges faced by Moldovan scientists. He hopes for fruitful collaborations with ACE members interested in ecological chemistry issues.



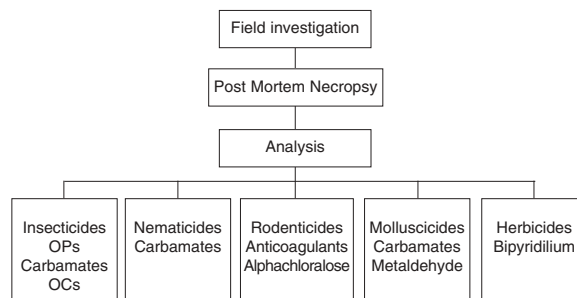
## 9. PESTICIDES AND THE ENVIRONMENT. POISONING OF ANIMALS 2001: THE ROLE OF THE CENTRAL SCIENCE LABORATORY

**Michael Wilson**

Head, Pesticides and Veterinary Medicines Group  
Central Science Laboratory, York UK  
m.wilson@csl.gov.uk

The Central Science Laboratory (CSL) plays a key role in the UK's on-going campaign against the illegal poisoning of animals by providing analytical support to the Wildlife Incidents Investigation Scheme (WIIS). The scheme investigates deaths of wildlife, including beneficial insects, pets and some livestock, where there is strong evidence to suggest that pesticide poisoning may be involved. Poisoning can arise from either accidental environment exposure or deliberate abuse of a pesticide. The scheme provides a unique means of post-registration surveillance of pesticide use, permitting risk assessments in this area to be made or revised.

WIIS was the subject of a recent poster at the ACE meeting in December (3<sup>rd</sup> EMEC meeting in Geneva) [1]. Ainsley Jones attended the event to highlight CSL's role in assisting with the unequivocal identification of pesticides found in animal tissues, baits and in the environment. Data for 2001 has recently been published by Defra [2] and provides a fascinating summary of: the balance between misuse, often careless use, of pesticides and abuse; the number and types of wildlife species involved and, most importantly, the enforcement actions that have followed up cases as part of the ongoing campaign to reduce incidents.



*A schematic of the Wildlife Incidents Investigation Scheme (WIIS) an the types of pesticides which are found during investigations in to the causes of wildlife mortality*

Additional information on WIIS can be obtained from Mark Fletcher ([m.fletcher@csl.gov.uk](mailto:m.fletcher@csl.gov.uk)) or through the Pesticides Safety Directorate website at:  
<http://www.pesticides.gov.uk/citizen/caip.new.htm>

[1] Post Registration Monitoring as a Tool to Investigate Effects of Pesticides on Vertebrate Wildlife in England and Wales.

[2] Pesticide Poisoning of Animals 2001: Investigations of Suspected Incidents in the United Kingdom. E.A. Barnett, M.R. Fletcher, K. Hunter and E.A. Sharp; Report of the Environmental Panel of the Advisory Committee on Pesticides; December 2002, Defra Publications PB7632.



## 10. PHARMACEUTICALS IN THE AUSTRIAN ENVIRONMENT

**Philipp Hohenblum**, O. Gans, G. Lorbeer, R. Sattelberger, S. Scharf  
Federal Environment Agency, Vienna, Austria  
Hohenblum@ubavie.gv.at

Pharmaceuticals are applied in huge quantities in human and veterinarian medicine. In Austria 11,567 pharmaceutical products were approved on the market in 2002 containing some 1,800 active ingredients that rendered a turnover of 1.9 Billion Euros [1]. Due to their positive aims to cure sicknesses, diseases and pathological ailments, to prevent and to recognise pathological alterations, possible environmental hazards have been neglected for a long time. Pharmaceuticals are excreted after application either metabolised, conjugated or unaltered with urine and faeces - and will be transferred by sewage systems. If these substances cannot be degraded in sewage treatment plants (STP) efficiently the aquatic system will be impacted. Additional potential sources of pharmaceuticals are improper waste disposals, industrial production and veterinary applications.

In the framework of an Austrian environmental control project, influents and effluents of Sewage Treatment Plants (STP) were sampled and analysed for pharmaceutical residues by means of GC/MS and LC/MS/MS [2]. All STPs were projected for at least 100,000 population equivalents. Analgesics (Diclofenac, Ibuprofen, Naxopren, Phenazone) were detected in almost all STP samples up to 3.5 µg/L (median 150 - 800 ng/l) with little differences between influent and effluent samples. Antibiotics (Sulfamethoxazole, Erythromycin, Trimetoprim) yielded in median concentrations between 70 and 400 ng/l, with little differences between influents and effluents as well. Also lipid regulators were detected frequently (Bezafibrate max. 5.5 µg/L, Clofibrate acid max. 420 ng/L, Fenofibrate max. 370 ng/L). The antibiotics Penicilline V and G could not be detected in any sample (LOD: 10 ng/L). Caffeine was detected in the highest measured concentrations of 58 µg/L in one influent sample. Median concentrations of 38.6 µg/L in the influent samples and 0.7 µg/L in the effluents were calculated. Carbamazepine was also found in all samples with median concentrations of 540 and 560 ng/L, respectively [3]. Hence, it was very likely that some of these substances would be encountered in the aquatic environment.

In the summer of 2001, the International Commission for the Protection of the Danube River (ICPDR) organised a sampling campaign of the whole Danube stream (Joint Danube Survey, JDS) where we received some extra samples of the Austrian stretch of the river. Among other parameters pharmaceuticals were analysed in order to prove whether or not we encounter them in surface waters. The outcome was that in all samples Caffeine, Carbamazepine and the x-ray contrast medium Iopromide were determined in concentrations higher than the limit of quantification (LOQ, 20 ng/L). Bezafibrate and Diclofenac could be detected in one sample, the other parameters could not be detected (LOD: 10 ng/L) [4].

Since ecotoxicological effect data are available only fragmentarily, the Danube

maximum concentrations were compared with acute toxicity values ( $EC_{50}$ , daphnia magna). The maximum environmental concentrations determined in the Danube river were at least five orders of magnitude lower than the effect concentrations.

Further investigations concerning pharmaceuticals are being carried out within several recent projects. TETSOIL will start in 2003 in order to study residual veterinarian antibiotics in manure and soil samples [5].

- [1] The Austrian Pharmacy – Facts and Figures. Austrian Chamber of Pharmacists, Vienna (2002).
- [2] Ternes T.A., Hirsch R., Müller J. and Haberer K. (1998) Methods for the determination of neutral drugs as well as betablockers and  $\beta$ 2-sympathomimetics in aqueous matrices using GC/MS and LC/MS/MS. *Fres. J. Anal. Chem.* **362**, 329-340.
- [3] Gans P., Sattelberger R. and Scharf S. (2002) Ausgewählte Arzneimittelwirkstoffe in Zu- und Abläufen kommunaler österreichischer Kläranlagen / Analysis of Selected Pharmaceuticals in In- and Effluents of Municipal Sewage Treatment Plants in Austria. *Vom Wasser* **98**, 165-176.
- [4] Kreuzinger N., Lorbeer G. and Scharf S. (2002) Joint Danube Survey – Results of the additional Austrian sampling programme, Vienna.
- [5] <http://www.ubavie.gv.at>

## 11. CYANOBACTERIAL MATS AND PETROLEUM MODEL COMPOUNDS

**Nimer Safi**,  
Institute of Chemistry and  
Biology of Marine Environ-  
ment (ICBM),  
Oldenburg, Germany  
n.safi@icbm.de



Nimer Safi from the Environmental Protection and Research Institute (EPRI) at Gaza, Gaza Strip (Palestine) is presently working with Prof. Dr. Jürgen Rullkötter at the Institute of Chemistry and Biology of the Marine Environment (ICBM), University of Oldenburg (Germany) in a trilateral project on "Bioremediation of Marine Pollutants by Marine Cyanobacterial Mats" funded by Deutsche Forschungsgemeinschaft (DFG). Mr. Safi collected naturally occurring cyanobacterial mats from five different sites in the Gaza Strip. The most interesting ones were found in Wadi Gaza.

This Wadi is one of the longest streams in Palestine and the only surface water in the Gaza Strip. It is heavily used for disposal of solid waste, sewage and agricultural and industrial wastewater. In the west, Wadi Gaza reaches the Mediterranean Sea. The connection to the sea is intermittent, depending on rainfall. Here, where the samples were collected, most of the cyanobacterial mats develop in the presence of high levels of pollutants, mainly diesel oil and other petroleum products. Cyanobacterial mat samples were taken from different sites along Wadi Gaza in May, 2000 and August, 2001, respectively. At the time of sampling the mats were submerged, the measured water

temperature was 25°C and 31°C, and the salinity was 2% and 3.6%, respectively. The mat samples were transferred within 24 hours to the laboratory at ICBM.

In the laboratory, slurry experiment with hydrophobic petroleum model compounds (pristane, phenanthrene, dibenzothiophene and *n*-octadecane) were carried out. The experiment was performed for 40 days. After 7 days all phenanthrene and dibenzothiophene and ca. 75% of pristane and *n*-octadecane were degraded.

In Gaza two cylindrical-shape concrete ponds with effective internal diameters of 6 m and a total net area of 27.5 m<sup>2</sup> each were established in 2000. This experimental station of EPRI allows mesocosm experiments under partly controlled conditions. One pond acts as a reference pond used as reservoir for freshly developed microbial mats for biodegradation experiments. It also serves as control for the development of untreated mats. The second pond is divided into six sections which are used for contamination experiments. A mesocosm degradation experiment was performed for 100 days. Degradation started immediately after addition of the model compounds and slowed down in the course of the experiment. After 50 days ca. 95% of phenanthrene and dibenzothiophene and ca. 75% of *n*-octadecane and pristane were degraded.



Microbial mats in Wadi Gaza

## 12 RECENT MEMBERS PUBLICATIONS

### Montserrat Filella

University of Geneva, Switzerland

Montserrat Filella has interests in many aspects of environmental chemistry, specifically the chemistry of natural waters, and environmental modelling and the development and application of new teaching tools (computer modelling, web-based resources). Her current research interests include the role of ligand physical and chemical heterogeneity in natural systems, metal ion speciation, and modelling colloid and particle behaviour in natural waters.

The ACE board would like to gratefully acknowledge the tremendous amount of time and energy that Monserrat contributed in organising the EMEC3 symposium in December 2002, in Geneva. The huge success of the meeting was largely due to her efforts.

Monserrat organised a workshop on "Teaching Environmental Chemistry", which took place on Thursday, 12 December after the day's EMEC3 sessions. Attendance to the Workshop was significant, much greater than expected, indicating that there is a real need for a forum for the exchange of teaching experiences and opinions. The wide variety of issues raised by the participants during the Workshop revealed the diversity of objectives and the dynamic nature of the discipline.

In order to ensure continuity to this first contact, Monserrat is now promoting the creation of a web-based workgroup that will be hosted by the University of Geneva. This workgroup is intended as a forum for information exchange as well as a repository and source of teaching

material. If you are interested in participating in this workgroup, please contact Montserrat montserrat.filella@cabe.unige.ch

Filella M., Belzile N. and Chen Y.-W. (2002) Antimony in the environment: a review focused on natural waters. I. Occurrence. *Earth Science Reviews* **57**, 125-168.

Huber C., Filella M. and Town R.M. (2002) Computer modelling of trace metal ion speciation: practical implementation of a linear continuous function for complexation by natural organic matter. *Computers and Geochemistry* **28**, 587-596.

Town R.M. and Filella M. (2002) The crucial role of the detection window in metal ion speciation analysis in aquatic systems: the interplay of thermodynamic and kinetic factors as exemplified by nickel and cobalt. *Anal. Chim. Acta*, **466**, 285-293.

### Andrew Hursthouse

School of Engineering and Science, Scotland

McQuaid-Cook J., Hursthouse A.S. and Allan F. (2002) Health, Safety, Environment and Waste Management Training: balancing business needs with academic goals. *J. Environmental Monitoring* **4**(5), 84N-87N.

Muir R., Wilson M., Rowley L., Smith F.J. and Hursthouse A.S. (2002) The potential of electrophilic epoxide reactions for the monitoring of acid gases in the environment. *J. Chromatography A*, **977**(2), 251-256.

Edgar P.E., Davies I.M., Hursthouse A.S. and Matthews J.E. (2003) An investigation of geochemical factors controlling the distribution of PCBs in intertidal sediments at a contamination hot spot, the Clyde Estuary, UK. *Applied Geochemistry* **18**(2), 327-338.

### Roland Kallenborn

Norwegian Institute for Air Research, Norway

Herzke D., Kallenborn R. and Nygård T. (2002) Organochlorines in egg samples from Norwegian Birds of Prey: Congener-, isomer- and enantiomer specific considerations. *Sci. Tot. Environ.* **291**, 59-71.

Kallenborn R., Gatermann R., Nygård T., Knutzen J. and Schlabach M. (2001) Synthetic musks in Norwegian Marine fish samples collected in the vicinity of densely populated areas. *Fres. Environ. Bull.* (FEB) **10/11**, 832-842.

Vetter W., Schlabach M. and Kallenborn R. (2001) Evidence for the presence of natural halogenated hydrocarbons in Southern Norwegian and polar air. *Fres. Environ. Bull.* (FEB), **11/4**, 170-175.

Roland has recommended the following references, which highlight several of the major present day issues involving anthropogenic pollutants:

Perfluorinated hazardous compounds found in substantial amounts in biota from remote regions like the Arctic (e.g. polar bears and seals): Refer to: Kannan K., Koistinen J., Beckmen K., Evans T., Gorzelany J.F., Hansen K.J., Jones P.D., Helle E., Nyman M. and Giesy J.P. (2001) *Environ. Sci. Technol.* **35**, 1593-1598.

Pharmaceutical residues in sewage pose risk for the environment and humans:

Refer to: the US-EPA homepage,  
<http://www.nap.edu/books/0309084865/html/> or  
Ternes, T. (2001) Pharmaceutical pollutants.  
*Biofutur*, **216**, 44-46.

Anthropogenic pollutants including organohalogens play a significant role in climate change processes: Refer to: Intergovernmental Panel on Climate Change (IPCC) Report on Climate Change 2001: The Scientific Basis. Contribution of working group I to the third Assessment Report of the IPCC (2001), Cambridge University Press, pp. 880, ISBN 0521 01495 6.

#### Eric Lichtfouse

Université de Bourgogne, France

Lichtfouse E., Lichtfouse M. and Jaffrézic A. (2003)  $\delta^{13}\text{C}$  values of grasses as a novel indicator of pollution by fossil-fuel-derived greenhouse gas  $\text{CO}_2$  in urban areas. *Environ. Science and Technology* **37**, 87-89.

Sen D., Lichtfouse E. and Mariotti A. (2002) Mild hydrolysis and alcohol compounds of humic acids. II. Alcohols in Hydrolysed products of humic acids. *Chinese J. Soil Sci.* **33**, 17-20.

#### Christian Mougin

Phytopharmacie et Médiateurs Chimiques, France

Mougin C., Jolival C., Malosse M., Sigoillot J.-C., Asther M. and Chaplain V. (2002). Interference of soil contaminants with laccase activity during the transformation of complex mixtures of polycyclic aromatic hydrocarbons (PAH) in liquid media. *Polycycl. Aromat. Comp.* **22**, 673-688.

Arrault S., Desaint S., Catroux C., Semon E., Mougin C. and Fournier J.-C. (2002). Isolation and characterization of efficient isoxaben-transforming Microbacterium sp. Strains from four European soils. *Pestic. Manag. Sci.* **58**, 1229-1235.

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Christian Mougin would like to announce the commencement of a new PhD project being undertaken by Aline Ghanem at the Unité de Phytopharmacie et Médiateurs Chimiques, INRA, Versailles, France. The subject is the fate and ecotoxicological impacts of pesticides contained in sewage sludges spread on agricultural soils. This research program is being directed by Christian and J. Einhorn, and is supported by PNETOX, ADEME and INRA.

#### Sixto Malato Rodríguez

Plataforma Solar de Almería, Spain

Parra S., Pulgarín C. and Malato S. (2002) New integrated photocatalytic-biological flow system using supported  $\text{TiO}_2$  and fixed bacteria for the mineralisation of isoproturon. *Appl. Catal. B: Environ.* **36**, 131-144.

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#### Kristiina Wähälä

University of Helsinki, Finland

Kristiina Wähälä was nominated in December 2002 as Organic Chemistry Professor at the University of Helsinki, Finland. Previously, she held a chair in organic chemistry at the University of Oulu and was acting professor in organic chemistry at the University of Helsinki. Established in 1761, the chair at the University of Helsinki was the first chemistry chair in Finland. Kristiina is the eleventh, and the first female holder of the chair.

Wilkinson A.P., Wähälä K. and Williamson G. (2002) Identification and quantification of polyphenol phytoestrogens in foods and human biological fluids. *J. Chromatogr. B*, **777**, 93-109.

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Kristiina Wähälä's  
research group at  
the University of Helsinki

## 13. THESIS REVIEWS

**Phytoextraction of thallium-contaminated soils by *Brassicaceae* genotypes: Role of chemical and spatial availability of thallium in soils and uptake capacity of roots**

**Husam Al-Najar,**

Institute of Plant Nutrition,

University of Hohenheim,

Stuttgart, Germany

Supervisor: Prof. Dr. Volker Roemheld

[h-najar@uni-hohenheim.de](mailto:h-najar@uni-hohenheim.de)

#### Abstract

Thallium (Tl) in the soils can occur from two different origins, geogenic related to the geochemistry of the soil and anthropogenic as a result of coal combustion, mining or deposits from cement plants. In Germany around cement plants in Leimen and Lengerich elevated Tl concentrations have been detected with serious food chain contamination. As a consequence

cultivation restriction for crop land around these cement plants has been pronounced by the administration.

It has been shown that species of *Brassicaceae* can widely differ in TI concentration in leaves when grown in TI-contaminated soils. In particular, distinct cultivars of kale (*Brassica oleracea acephala* L. cv. Winterbor F1) can almost reach TI concentrations of TI-hyperaccumulator plants adapted to TI-contaminated soils such as candytuft (*Iberis intermedia* Guers.).

A main objective of the current Ph.D. study was to evaluate the following main limiting factors for a high TI acquisition by TI-hyperaccumulator plants to assess the feasibility of a clean-up of the TI-contaminated soils by the mean of phytoextraction (phytoremediation): a) the chemical availability of TI in the rhizosphere of TI-hyperaccumulator plants, b) the spatial availability due to root morphology such as root length density and root hair length and c) the uptake capacity of roots for TI. In addition, various techniques were applied to enhance TI extraction such as lowering soil pH (e.g. by S supplement) and rhizosphere pH ( $\text{NH}_4^+$  supply with nitrification inhibitor) as well as supplement of chelators (EDTA, NTA). In addition different cultivation management were used to reduce the growth suppression by replant disease.

The following main results have been achieved:

- 1) In the rhizosphere soil of both used plant species, up to 14% of total TI could be depleted during one growth cycle.
- 2) In a study with kale grown in pots with different size and nitrogen supply which affected root/shoot ratio, root length density and root hair length, the importance of the spatial availability could be proved.
- 3) A chemically assisted phytoextraction due to reduced soil pH, e.g. by application of elemental sulphur, promised as a potential measure.
- 4) Negative effects of replant disease on growth and thus on TI extraction could be successfully minimised by use of methylbromide or  $\text{CaCN}_2$  but also by a fallow or periodical intercropping of non-*Brassicaceae* in rotation.

Finally, commercial hybrid cultivars and some of their lines were tested in field experiments and in nutrient solution culture for their TI acquisition and TI-uptake capacity. From these experiments it can be concluded that the main reason for the high TI acquisition of the TI-hyperaccumulating cultivars and plant species is the uptake capacity, presumably a transporter in the plasma membrane of root cells, and not primarily changes in the rhizosphere due to release of protons and root exudates or microbial activities.

From the various achieved results it can be concluded that TI-contaminated soils like in the area of Leimen can be cleaned up by phytoextraction with efficient cultivars of kale within a measurable time scale of about 15-20 successive cultivations. In contrast to Cd and Zn contaminated soils, where hundreds till thousand years are required with plants species at the moment available, this would be the first example for a successful phytoextraction of a soil under field conditions within a reasonable time.

## 14. MEETING REVIEWS

### 2<sup>nd</sup> European Meeting on Solar-chemistry and Photocatalysis: Environmental Applications - SPEA2

May 2002, Saint-Avold, France

After the success of the first meeting on Solar Energy, Solar Chemistry and Environment "JCSEE" held in Saint-Avold on February 2000, the Organizing committee chaired by Dr. Didier Robert and hosted by Pr. Jean Victor Weber, Head of the Environment and Clean Processes Group of LCA, decided to organize an International meeting in May 2002, open to university, government and industrial research laboratories.

The main topics of this meeting were focused on environmental applications of Solar Chemistry, Solar Thermochemistry and more specifically of Heterogeneous Photocatalysis. Seven main general subjects were selected:

1. Water treatment and disinfection
2. Air and soil treatment
3. Green synthesis by solar-chemistry, photochemistry and photocatalysis
4. Developments of new materials for photochemistry and photocatalysis
5. Development and perspectives in environmental photochemistry
6. Commercial applications
7. Solar thermochemistry

At the beginning of third millennium, environmental concerns have never been so strong. Thus the development of detoxification technologies for water and air is in constant progression and is a significant research object. This is certainly the case for advanced oxidation processes and in particular of solar or artificial photocatalysis, attested by the significant number of participants (nearly a hundred) as well as their various and varied origins (22 countries from four continents). Research on this topic is in full flow, not only on the level of the public and university research organizations but also amongst major industrial groups. It is important to note that the low registration fees for all participants were aided by sponsorship and we would like to thank: Saint-Gobain-Research, Millennium Chemicals, the city of Saint-Avold, The Région Lorraine, the European Association of Chemistry and Environment (ACE) and the University of Metz.

In addition to 4 invited lectures, 80 contributions were submitted by participants, among which 42 selected for oral presentation and other for poster sessions. The first plenary lecture of the meeting was presented by Prof. David Ollis (North Carolina State University, Raleigh, USA). The title of this contribution was "Integrating photocatalysis and membrane technologies for water treatment". The second plenary lecture was presented by Prof. Michael Grätzel from EPFL Lausanne (Switzerland), entitled "Photocatalysis and Photoelectrochemistry with Nanocrystalline Oxide Semiconductors". The title of the third lecture was "Photocatalytic degradation of organic compounds in aqueous and gas phase" by Dr. Marie-Thérèse Maurette from Toulouse University (France). Finally, Pr. Michel Bouchy from ENSIC Nancy (France) presented the last plenary lecture, "Photocatalytic reactor".



Several industries were present: Ahlstrom Paper Group who use deposited titania catalysts for water and purification; Saint Gobain Glass Company, providing self-cleaning glasses; Millennium Inorganics and Degussa as photocatalytic titania producers, and GTM construction company, demonstrating the advantages of self-cleaning buildings made of concrete and cements covered with titania. During the closing ceremony, it was announced that the 3<sup>rd</sup> congress (SPEA 3) will take place in Barcelona, organised in 2004 by the University of Barcelona (Pr. Jaime Gimenez) in 2004.

#### Dr. Didier Robert

Chairman of the organizing committee of SPEA-2  
Environment and Clean Processes Group  
University of Metz  
Saint-Avold France.  
drobert@iut.univ-metz.fr



#### The Clean Air Revolution – 50 Years after the London Smog

Thursday 5<sup>th</sup> December 2002, Portcullis House,  
Westminster, London

Organised jointly by the Parliamentary Office of Science and Technology (POST) and the National Society for Clean Air and Environmental Protection (NSCA).

Fifty Years Ago, in December 1952, London's great smog killed thousands of people. Through public and political pressure, the Clean Air Act was introduced in 1956, which brought about a major improvement in air quality.

The 50<sup>th</sup> Anniversary of the "great" smog was recognised by a meeting to launch the NSCA's report "The Clean Air Revolution: 1952-2052" [1], a document which reviews the improvements in air quality in the UK in the last 50 years and also looks forward to challenges and issues in the next 50 years. The chapters in the report are authored by distinguished members of the scientific, regulatory and industrial community and provide an accessible "state of the art" overview. It was accompanied by a well written briefing note published by POST [2].

The meeting was held in an impressive venue - the working offices of the UK parliamentarians. Over 100 invited delegates attended, from politicians and senior regulators through to members of the academic and local government air quality community. The meeting Chair was Lord Lewis. A series of short presentations were made by Lord Flowers and Professor Peter Brimblecombe on "the way it was", reminiscing about the smog problem that was tackled. Dr. Bob Maynard, UK Department of Health who gave an overview of the major health issues and impacts and to round off, a view from the political side with Rt Hon. Alun Michael MP, (UK Minister of State for Rural Affairs and Urban Quality of life), discussing future plans for air quality in the UK.

The presentations were excellent and the forum quite unique, providing a wide mix of opinion and debating an issue that has enormous political and scientific complexity. The reports do well to bring this together.

- [1] The Clean Air Revolution: 1952-2052, Clean Air and Environmental Protection 32(4), Winter 2002, National Society for Clean Air and Environmental Protection, Brighton  
<http://www.nasca.org.uk/>
- [2] Air Quality in the UK, PostNote 188, November 2002  
<http://www.parliament.uk/post/report.htm>

#### 5<sup>th</sup> International Conference of The Balkan Environmental Association (BENA) on Trans-boundary Pollution

7-10 November 2002, Belgrade, Yugoslavia

Co-Organized by:

- University of Belgrade
- Institute of Nuclear Sciences "Vinca"
- Megatrend University of Applied Sciences
- Yugoslavian Physical Society

The issues surrounding trans-boundary pollution are evidently of great interest at present, since the 5<sup>th</sup> International Conference of the BENA was extremely well attended, with almost 400 participants and encompassing 98 oral presentations and 184 posters from 11 countries (Balkan countries, Italy, Germany and Israel). Topics covered air, water and soil pollution and management, clean technologies, recycling, and environmental education and legislation.

The aim of the Conference was to bring together the members of B.EN.A. and specialists working in the fields of Environment, to examine and to discuss current problems, concerning Environmental pollution, protection and transboundary effects in the Balkan region.

The following represent only a small number of the conclusions reached at the meeting; a full description can be obtained from Aleksandra Mihajlidi-Zelic, Secretary of the YU-B.EN.A. Office (amzelic@chem.bg.ac.yu).

A need was recognized:

- To establish, under the coordination of B.EN.A., networks of laboratories that deal with trans-boundary pollutants.
- To encourage the collaboration of Institutes in our countries for common projects with funding from the European Union and other International Organizations.
- To encourage the promotion of European Legislation in the whole Balkan area.
- To issue the "Green Book" which will describe the several areas of the Balkan peninsula, taking into account the sources and the extension of pollutants. Special efforts must be done, to protect the unique biodiversity of the peninsula
- The "TEN B.EN.A. INDICES", regarding the sustainable development of each Balkan country are very important for the European integration of the region. This integration can be achieved with the collaboration of the Ministries of Environment with B.EN.A.
- The Official Journal of B.EN.A. will publish basic results of collaborative ecological projects and discussions on possible trans-boundary problem situations and proposals for solutions.



A Round Table discussion on the "Regional Nuclear Safety Program of B.EN.A." resulted in the following conclusions:

An International working group under the name NU-B.EN.A. will be established, in order to examine and to propose solutions to the existing nuclear safety problems of the region.

The priorities that have been set are:

- Environmental impact and risk assessment for all NPP of the region (Kozlodui, Chernavoda and Croatia-Slovenia)
- Nuclear wastes safety storage - Legal and illegal
- Depleted - U.
- Recycling of any kind of nuclear materials in a safe way
- Improve the mutual trust between neighboring countries of the region, regarding Nuclear Safety
- Examine the increasing nuclear pollution to agriculture (due to K, U, etc.)

## 15. MEETING ANNOUNCEMENTS

### NEXT ACE MEETINGS

#### 10-13 December 2003 - 4<sup>th</sup> European Meeting on Environmental Chemistry PLYMOUTH, UNITED KINGDOM

Looking ahead to December 2003, Mark FITZSIMONS from the Department of Environmental Science, Plymouth, UK is already making preparations for the 4<sup>th</sup> ACE meeting. Allow yourself to be stunned by picturesque Dartmoor, the breathtaking coastline and combine that with deliciously fresh seafood, traditional beers and ciders and seasonal entertainment from Christmas classical concerts. Not to be missed!

Dr. Mark Fitzsimons  
[www.ace2003.org.uk](http://www.ace2003.org.uk)



#### December 2004 - 5<sup>th</sup> European Meeting on Environmental Chemistry BARI, ITALY

Dr. Michele Aresta  
[aresta@metea.uniba.it](mailto:aresta@metea.uniba.it)



#### December 2005 - 6<sup>th</sup> European Meeting on Environmental Chemistry BELGRADE, YUGOSLAVIA Dr. Branimir Jovancicevic

#### December 2006 - 7<sup>th</sup> European Meeting on Environmental Chemistry BRNO, CZECH REPUBLIC Dr. Josef Caslavsky

### OTHER MEETINGS

#### 2-4 April 2003 - 3<sup>rd</sup> Annual International Arctic Workshop Tromsø, Norway <http://www.npolar.no>

#### 14-16 April 2002 - Envirpharma Lyon, France <http://www.envirpharma.org>

#### 27 April-1 May 2003 - SETAC Europe Hamburg, Germany <http://www.setac.org/hamburg.html>

#### 12-16 May 2003 - ConSoil 2003. The 8<sup>th</sup> International FKZ/TNO. Ghent, Belgium <http://www.consoil.de/>

#### 18-22 May 2003 - 3<sup>rd</sup> Conference on Oxidation Technologies for Water and Wastewater Treatment. Goslar, Germany <http://www.cutec.de/aop3>

#### 30 May-3 June 2004 - 4<sup>th</sup> Conference on Contaminants in Freezing Ground Alaska, USA <http://www.freezingground.org/conference>

#### 8-12 June 2003 - 38<sup>th</sup> National Organic Symposium Bloomington, Indiana, USA <http://www.NOS2003.org>

#### 15-19 June 2003 - 7<sup>th</sup> International Conference on the Biogeochemistry of Trace Elements Uppsala, Sweden <http://www-conference.slu.se/7thICOBTE/index.htm>

#### 18-22 June, 2003 - Chemistry and the Environment Krusevac, Yugoslavia <http://www.shd.org.yu>

This meeting is hosted by the Serbian Chemical Society, one of the oldest scientific societies in Europe and the tenth oldest chemical society in the world, founded in Belgrade in November 1897. 20-25 selected papers from this meeting will be published in *Environmental Chemistry Letters*, the official Journal of the European Association of Chemistry and the Environment.

The program of the meeting will feature:

- Analytical methods and pollutant monitoring systems
- Transport, transfer and transformation of chemicals in the environment (pollutant chemodynamics, prognosis, risk assessment), and the influence of pollutants on material deterioration
- The control of negative anthropogenic influences on bio-chemical processes and on the environment
- Environmental aspects of technological processes
- The effects of chemical accidents and war activities on the environment
- Environmental pollution by radionuclides
- Environmental chemistry and education
- Environmental management (tools, mechanisms and implementation)

#### 24-29 August 2003 - Dioxin 2003 Boston, Massachusetts, USA <http://www.dioxin2003.org>

#### 7-11 September 2003 - 6<sup>th</sup> International Conference on Environmental Geochemistry Edinburgh, Scotland <http://www.iseg2003.com/index.htm>

#### 7-11 September 2003 - Biogeochemistry of Chelating Agents New York, USA <http://oasys.acs.org/> <http://www.envirofacs.org>

A special session is being included in the Environmental Chemistry Division of the American Chemical Society at the 226<sup>th</sup> ACS National Meeting. This symposium will focus on the complex chemical and biological reactions of anthro-

pogenic chelating agents in natural systems.

**8-12 September 2003 - The 18<sup>th</sup> Colloquium on High Resolution Molecular Spectroscopy**  
Dijon, France  
<http://www.u-bourgogne.fr/LPUB/HRMS>

**22-27 September 2003 - 3<sup>rd</sup> Meeting of the European Academy of Forensic Science**  
Istanbul, Turkey  
<http://www.eafs2003.org/>

**11-14 November 2003 - Arctic Climate System Study (ACSYS) Final Conference**  
St. Petersburg, Russia  
<http://acsys.npolar.no/meetings/final/conf.htm>

## 16. NEW PROJECTS

### 5<sup>th</sup> EU FRAMEWORK PROGRAMME

#### **A Coupled Advanced Oxidation-Biological Process for Recycling of Industrial Wastewater Containing Persistent Organic Contaminants (CADOX)**

A research project supported by the European Commission under the 5<sup>th</sup> Framework Programme and contributing to the programme "Energy, Environment and Sustainable Development". Contract no. EVK1-CT-2002-001221. Coordinated by Dr. Sixto Malato, CIEMAT, Spain [sixto.malato@psa.es](mailto:sixto.malato@psa.es).

CADOX activities have been initiated in February 2003. The project has a duration of 36 months. <http://sol2.psa.es/webeng/cadox>

#### **Problems to be solved**

Since the first European directive in 1975, much progress has been made in tackling point source contamination of Europe's waters. But severe pressures remain regarding Priority Hazardous Substances, PHS [Decision no 2455/2001/EC of the European Parliament and of the council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC]. Human health is threatened by high concentrations of pesticides, heavy metals, hydrocarbons, chlorinated hydrocarbons, etc. dissolved in water which source is usually industrial wastewaters containing PHS at low-medium concentration (<500 mg/L). In this context, the IPPC Directive (96/61/EC) has requested the development of technologies and management practices for specific industrial sectors (see Annex I of the Directive) for the minimisation of pollution and for the development of water recycling. Due to the lack of available on-site treatment technologies, a large quantity of the industrial activities included in Annex I of IPPC Directive are not treating these wastewaters appropriately. As consequence, simple, low cost and at hand technologies are very necessary. CADOX is addressed to develop a suitable technology that could fulfil this gap. CADOX technology will focus on non-biodegradable chlorinated solvents (NBCS), biocides and plant protection products, considered as PHS and which producers are included as objective of the IPPC Directive implementation.

#### **Scientific and technical approach**

Although everybody recognises the strong potential of Advanced Oxidation Processes

(AOPs) for PHS-containing wastewater treatment, it is also well known that operational costs of these AOPs for the total oxidation of hazardous organic compound remains relatively high compared to those of a biological treatment. However, their use as a pre-treatment step for the enhancement of the biodegradability of wastewater containing recalcitrant compounds can be justified if microorganisms in a biological treatment readily degrade the intermediates resulting from the reaction. Therefore, the coupling of AOPs and biodegradation has a great advantage over either treatment alone in the remediation of organic contaminants. This Project will create and demonstrate a new technology that could reduce substantially the treatment costs of wastewaters containing PHS. Thus, the problem-solving approach of the project will determine the best conditions for combining TiO<sub>2</sub>/Photo-Fenton photocatalysis (driven by Solar Energy), Ozone and Biodegradation in the treatment of wastewaters originating in industries and containing highly toxic compounds considered as PHS.

#### **Expected impacts**

Due to the lack of available on-site treatment technologies, a large quantity of the industrial activities included in Annex I of IPPC Directive are not treating their wastewaters appropriately. Further, under the requirements of the Water Framework Directive, emissions of PHSs would need to be reduced to zero. CADOX technology favours the application of safe, cost effective, modern and efficient technologies for reducing the necessities of banning substances very important for the economic growth. Consequently, the implementation of the CADOX will help to safeguard the future of most industries and to prove their environmental competitiveness. The main deliverable for exploitation will be the CADOX Technology Handbook. This handbook is expected to help the marketing of the technology and to be like a matrix indicating the adequate combinations for the most effective treatment. As result it is expected that all participants will increase their competitiveness and consolidate their current position. From the technological point of view, the development of a new hybrid Solar-AOP/Biotreatment process with strong market possibilities is considered the most important contribution of the project. The development of Solar Energy Technologies is an important topic for the EU, which in general lacks conventional non-renewable sources of energy. CADOX proposal is considered of significant importance because the research developed in the field of AOPs during the last years has led to a reasonable knowledge of the processes, but practical and economical systems are not yet available.

#### **Cost Effective Solar Photocatalytic Technology to Water Decontamination and Disinfection in Rural Areas of Developing Countries (SOLWATER)**

A research project supported by the European Commission under the 5<sup>th</sup> Framework Programme and contributing to the programme "Confirming the International Role of Community Research".

Contract no. ICA4-CT-2002-10001

Coordinated by Julian Blanco, CIEMAT, Spain  
[Julian.blanco@psa.es](mailto:Julian.blanco@psa.es)

SOLWATER activities were initiated in November 2002. The project has a duration of 36 months. <http://www.psa.es/webeng/solwater>.

The SOLWATER Project main objective, and expected project result, is the development of a fully autonomous system to the disinfection and elimination of trace organic contaminants in household drinking water in rural areas of developing countries, without any chemical addition and with the only use of energy from sunlight. The proposed technology would be based on the photocatalytic generation, by using sunlight, of hydroxyl radicals and singlet oxygen species to, respectively, detoxify and disinfect contaminated drinking water. Titanium dioxide photocatalytic process will be used to hydroxyl radical generation and Ru(II) polypyridyl complexes will be used to singlet oxygen production. A small photovoltaic cell would provide the energy to continuously pump the water through the reactors. Where convenient, the proposed device could be easily adapted to only detoxification or disinfection applications. This general objective is expected to be achieved by the successful obtainment of the following scientific and technological partial objectives.

#### Scientific objectives:

1. Assessment of persistent residual effect of Ru(II) singlet oxygen process over specific selected bacterial colonies, such as *Streptococcus faecalis*, coliforms, *Escherichia coli*, *Mycobacterium Tuberculosis* and *Vibrio Cholerae*.
2. Determination of combined photo-killing effect of hydroxyl and singlet oxygen radicals (generated by the previously mentioned processes) over the same target micro-organisms.
3. Assessment of titanium dioxide photocatalytic degradation efficiency at ppm/ppb level, using selected target hazardous water contaminants: pesticides, chlorinated compounds, etc.
4. Determination of combined effect of hydroxyl and single oxygen radicals (generated by the previously mentioned processes) over degradation of the same organic contaminants, at trace level.

#### Technological objectives:

1. Development of an efficient solar photocatalytic reactor to hydroxyl radicals generation, by supported titanium dioxide systems, to organic contaminants degradation.
2. Development of an efficient solar photocatalytic reactor to singlet oxygen radicals generation, based on polymer-supported sensitizers, to bacterial disinfection.
3. Development of the most yearly efficient optic for sunlight capture adequate to the local latitude and the useful wavelength of light related with the photocatalytic/photosensitising processes to be used. This optic would be based on static Compound Parabolic Concentrators (CPCs).
4. Development of a low-cost and robust static solar collector with long-term reliability to integrate previous reactors, optic and hydraulic systems (it must be noticed that low-cost is not a primary objective of this proposal; if final system fulfil efficiency expectations, cost reduction would be addressed at later stages by project Consortium).

## 17. WEBLINKS:

A new **internet-searchable database** of environmental methods (NEMI) is available. Further information is available at

[www.envirofACS.org](http://www.envirofACS.org).

Lawrence H. Keith  
Instant Reference Sources, Inc.  
<http://www.nemi.gov>

**PFMODELS** is a recent initiative aimed at the pesticide fate modelling community and features a private discussion list and a web site, which presents information on pesticide fate models and their use. Igor G. Dubus  
PFMODELS list owner and web master  
[www.pfmodels.org](http://www.pfmodels.org)

## 18. MINUTES OF THE ACE BOARD MEETING

The ACE Board Meeting has been held on 12 December 2002 in Geneva, Switzerland. Present: Josef Caslavsky (Czech Republic), Stephanie Dudd (UK), Brigitte Elbisser (France), Mark Fitzsimons (UK), Ainsley Jones (UK), Branimir Jovancicevic (Yugoslavia), Roland Kallenborn (Norway), Eric Lichtfouse (France), Didier Robert (France), Jan Schwarzbauer (Germany), Immacolata Tommasi (Italy).

### Selection of the jury for ACE Environmental Chemistry Award

A jury was selected from those present to judge posters for the ACE Environmental Chemistry Award, consisting of Stephanie Dudd (UK), Roland Kallenborn (Norway) and Didier Robert (France).

### Price for 2003 ACE membership

The price for 2003 ACE membership was discussed. The main issues concerned whether membership should include a subscription to the Association journal, *Environmental Chemistry Letters* (ECL), and the price at which membership should be set. It was decided that 2003 ACE membership should include receipt of ECL, as this was an integral to the association. A membership fee for ACE of 50 Euros was then unanimously agreed. It was felt that this price was very affordable, would help circulation of the journal and represented excellent value for money, considering the other available membership benefits. It was also agreed that members of the ACE Board would pay the same price for membership.

### Restructuring of ACE Board and Elections

It was suggested that a restructuring of the ACE Board was necessary in order to make the organisation more effective. A number of positions were proposed and most of these were accepted, while other positions were created with titles and task descriptions that were felt to be more suitable. New positions suggested were as follows:

#### ACE Marketing Officer (2 positions)

It was felt that two people would be needed to do this job effectively, given the projected workload.

#### European Information Manager

The duties for this post will include updates for members on EC research calls to be disseminated through the ACE newsletter and the Collaboration Network.



#### *Assistant Treasurer*

To assist the ACE Treasurer and ensure that transparent accounts are prepared and circulated to ACE Board before December annual meeting, prior to publication.

#### *European Regional Officer (2 positions)*

It was thought that two positions were needed, for Western and Eastern Europe. They will promote awareness of ACE in their region, and co-ordinate links and activities with ACE and regional organisations.

The following list of ACE Board positions was then unanimously agreed:

- Chairperson (overall co-ordination of ACE activities)
- Secretary (communication and information for ACE)
- Treasurer (ACE accounts and spending)
- Assistant Treasurer (auditing of ACE accounts for ACE Board meeting)
- Webmaster (maintenance of ACE website)
- Collaboration Network Officer (ACE Collaboration Network)
- Past Meeting Officer (will help EMEC organiser)
- EMEC Organiser (current meeting organiser)
- Future Meeting Officer (future meeting organiser)
- ACE Marketing Officer
- ACE Marketing Officer
- European Regional Officer (Eastern Europe)
- European Regional Officer (Western Europe)

According to ACE bylaws, elections must take place every 3 years. Since the first ACE Board was officially constituted on September 28, 2000, there will be elections in 2003. All ACE Board positions are open to candidates (i.e. ACE members that have paid the 2003 membership fee) and actual Board members can also apply. A call for candidates will be sent to ACE members that have paid the 2003 membership fee.

Mark Fitzsimons volunteered to become Webmaster from 2004 if this position was not filled by election.

#### **ACE Board communication**

The original item concerned the role of ACE Board members and it was felt that much of this had been covered in Item 3. It was suggested that consultation with Board members could be improved and that everyone should be kept up to date on ACE activities. A discussion then followed on how Board members could be kept informed without making this an onerous task. The suggestion that received the most support was the creation of a secure page on the ACE website, where information could be posted. It would then be up to Board members to visit the site regularly for updates.

#### **ACE Board meetings**

It was agreed that at least two ACE Board meetings per year were necessary for efficient running of the organisation. The December meeting should continue as most Board members attend the annual EMEC and can get funding for this. However, a summer meeting would probably have to be paid for by Board members themselves. Nonetheless, Board members present were prepared to attend a summer meeting and meet the costs themselves, if necessary. Stephanie Dudd volunteered to organise the first summer meeting in 2003 in Manchester and this was accepted by the ACE Board.



*The ACE Board Meeting has been held on 12 December 2002 in Geneva, Switzerland.*

#### **ACE Regional Links**

Branimir Jovancevic circulated information on the Serbian Chemical Society and gave a summary of its history. He extended an invitation to Roland Kallenborn (air pollution), Jan Schwarzbauer (sediment pollution) and Eric Lichtfouse (presentation of ACE) to present at the June 2003 - II Regional Symposium "Chemistry and the Environment" to be held in Serbia, Yugoslavia (Krusevac).

#### **Future EMEC venues**

##### *EMEC6*

Branimir Jovancevic had already offered to host EMEC6 in Belgrade. This meeting has the official support of the Serbian Chemical Society and of the University of Belgrade. He said that meeting costs would be very affordable and delegates could expect a warm welcome in Belgrade. This would also help to build links with environmental chemists in Eastern Europe.

##### *EMEC7*

Josef Caslavsky offered Brno in the Czech Republic as the venue for EMEC7. This is the second city in the country, with a population of 400,000, and an established university. It has good travel connections and those Board members with knowledge of Brno agreed that it would make a very good venue for the meeting.

The ACE Board members were unanimous in their support of these meeting venues.

#### **ACE Financial Status**

On current projections, ACE finances were expected to remain positive until March 2003, though this did not take into account any financial benefits from the Geneva meeting, which was well attended.

The main outgoings were listed as: 10000 Euros per year to be paid to Springer for ECL journal (for 2 years), 5000 Euros paid up front for Geneva meeting (EMEC3). A precise budget would be prepared when the accounts for EMEC3 had been settled.

#### **Any Other Business**

##### *Newsletter*

The format, goal and number of issues were discussed. It was widely felt that the current format was interesting and informative and so it should continue unchanged, with some flexibility depending on the information received. It was agreed that the goal of the newsletter was to keep members informed of any activities in environmental chemistry that might be of interest, including meeting reports, short articles, research awards and publications. Future issues will be supplemented by information such as EC research calls etc.

#### ACE Young Researcher Award

This is the first year of this award and the number of applications (7) was disappointing. A lot of advertising was undertaken but it was thought that this might be better directed at research group leaders, who could encourage candidates to come forward from within their groups. This would also help with any lack of confidence from non-native speakers about making an application in English. Stephanie Dudd reported difficulty in forming a jury for consideration of candidates. It was agreed that a permanent committee should be established, with a member of the EMEC local organising committee taking part each year.

**Dr. Mark Fitzsimons**

## 19. NEW ACE MEMBERS

New members to the association are always welcome and details regarding membership are available at: <http://www.u-bourgogne.fr/ACE>

ACE welcomes new members:

**LAHOUTIFARD Nazafarin**, Ottawa, CANADA  
**SCHARF Sigrid**, Wien, AUSTRIA  
**JOLIVALT Claude**, Paris, FRANCE  
**MAURETTE Marie-Thérèse**, Toulouse, FRANCE  
**BENOIT-MARQUIÉ Florence**, Toulouse, FRANCE  
**QUENEA Katell**, Paris, FRANCE  
**FORTUNATI Gustavo Umberto**, Milano, ITALY  
**EGGEN Trine**, Ås, NORWAY  
**KARDOS Nathalie**, Bourget du Lac, FRANCE  
**GUITTONNEAU Sylvie**, Bourget du Lac, FRANCE  
**COMBET Evelyne**, Bourget du Lac, FRANCE  
**GIBB Stuart W.**, Thurso, SCOTLAND  
**CHON Hyo-Taek**, Seoul, KOREA  
**SAFI Nimer**, Oldenburg, GERMANY  
**KUBUROVIC Natasha**, Belgrade, YUGOSLAVIA  
**KLEIN Didier**, Belfort, FRANCE  
**ADDOU Ahmed**, Mostaganem, ALGERIA  
**HAMID Aleboyeh**, Mulhouse, FRANCE  
**ELVAS-LEITAO Ruben A.**, Lisboa, PORTUGAL  
**MATOS Manuel José**, Lisboa, PORTUGAL  
**GONZALEZ PEREZ José Antonio**, Sevilla, SPAIN  
**TOMMASI Immacolata**, Bari, ITALY  
**PETRUZZELLI Gianniantonio**, Pisa, ITALY  
**KRONIMUS Alexander**, Aachen, GERMANY  
**LEITA Liviana**, Gorizia, ITALY  
**DERENNE Sylvie**, Paris, FRANCE

## 20. HUMOUR:

### *New element discovered*

The heaviest element known to science was recently discovered by university physicists. The element, tentatively named Administratium, has no proton or electrons and thus has an atomic weight of 0. However, it does have one neutron, 70 vice neutrons, and 161 assistant vice neutrons. This gives it an atomic mass of 232. These 232 particles are held together in a nucleus by a force that involves the continuous exchange of meson-like particles called morons.

Since it has no electron, Administratium is inert. However, it can be detected chemically, as it impedes every reaction it comes in contact with. According to researchers, a minute amount of Administratium, added to one reaction, caused it to take four days to complete. Without the Administratium, the reaction ordinarily occurred in less than one second.

Administratium has a normal half-life of

approximately three years, at which time it does not actually decay, but instead undergoes a reorganisation in which assistant neutrons, vice neutrons and assistant vice neutrons exchange places. Studies seem to show the atomic number actually increasing after each reorganisation.

Research indicates that Administratium occurs naturally in the atmosphere. It tends to concentrate in certain locations such as government agencies, large corporations and universities. It can usually be found in the newest, best-appointed and best maintained buildings.

Scientists warn that Administratium is known to be toxic, and recommend plenty of fluids and bed rest after even low levels of exposure.



## 21. THANKS!!

### **Many thanks to contributors to the newsletter and their colleagues/collaborators**

Al-Najar Husam, (h-najar@uni-hohenheim.de)  
Boudon Vincent, (Vincent.Boudon@u-bourgogne.fr)  
Dubus Igor G., (i.dubus@cranfield.ac.uk)  
Duca Gheorghe, (duca@mrda.md)  
Filella Monserrat, (montserrat.filella@cabe.unige.ch)  
Fiol Santalò Núria, (nuria.fiol@udg.es)  
Fitzsimons Mark, (mfitzsimons@plymouth.ac.uk)  
Gibb Stuart, (Stuart.Gibb@thurso.uhi.ac.uk)  
Hassler Christel S., (Christel.Hassler@cabe.unige.ch)  
Hohenblum Philipp, (Hohenblum@ubavie.gv.at)  
Hursthouse Andrew, (hurs-ch0@wpmail.paisley.ac.uk)  
Jovancicevic Branimir, (bjovanci@chem.bg.ac.yu)  
Kallenborn Roland, (rok@nilu.no)  
Keith Lawrence H., (larrykeith@earthlink.net)  
Kirso Uuve, (uuve@kbfi.ee)  
Malato Rodríguez Sixto, (sixto.malato@psa.es)  
Mihajlidi-Zelic Aleksandra, (amzelic@chem.bg.ac.yu)  
Mougin Christian, (Christian.Mougin@versailles.inra.fr)  
Nowack Bernd, (nowack@ito.umnw.ethz.ch)  
Robert Didier, (Didier.Robert@iut.univ-metz.fr)  
Safi Nimer, (n.safi@icbm.de)  
Wähälä Kristiina, (kristiina.wahala@helsinki.fi)  
Wilson Michael, (m.wilson@csl.gov.uk)

The views expressed in this communication may not necessarily be the views held by The Association of Chemistry and the Environment.

designed by: Brigitte Elbisser@libertysurf.fr, photos: ACE

<http://www.u-bourgogne.fr/ACE>

## APPLICATION FOR MEMBERSHIP 2003

(please write in BLOCK LETTERS)

Please fill this form and send it together with the membership fee  
(cash: 50 Euros\*) by POST MAIL (only) to:

\*This fee includes the receipt of all 2003 issues of the journal  
*"Environmental Chemistry Letters"*

European Association of Chemistry and the Environment  
**Memberships**  
Dr. Eric LICHTFOUSE  
Centre des Sciences de la Terre, Université de Bourgogne  
6, Boulevard Gabriel  
21000 Dijon FRANCE

LAST NAME:

.....

FIRST NAME:

.....

MALE:

☐

FEMALE:

☐

INSTITUTE:

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POST ADDRESS:

.....

.....

ZIP CODE: .....

TOWN: .....

STATE: .....

COUNTRY: .....

EMAIL ADDRESS(ES): .....

WEB SITE: <http://>.....

Date: .....

Signed:

