

**ELECTROCHEMISTRY AND INTERFACIAL
CHEMISTRY IN ENVIRONMENTAL CLEAN-UP
AND GREEN CHEMICAL PROCESSES**

Poster presented at the
IUPAC Congress/General Assembly
July 2001

OBJECTIVES

- **To increase awareness of the importance of electrochemistry and surface chemistry in environmental clean-up and environmentally friendly industrial chemical processes**
- **To disseminate the information to the industrial and academic chemical community throughout the world**

DESCRIPTION

Industrial and academic experts need to share experience and information on the role of electrochemistry and colloid and surface chemistry in environmental clean-up, remediation, and green chemical processes, concerning contributions to curing existing environmental problems and to preventing future ones through process integrated environmental protection.

A first Workshop-style meeting has been organized in Europe; a second in the USA/Canada is under consideration.



Specialists, as well as scientists from developing countries who can describe the particular problems their countries face, are invited.

IUPAC Goals and Strategic Thrusts Addressed

1. IUPAC will serve as a scientific, international, non-governmental body in objectively addressing global issues involving the chemical sciences. Where appropriate, IUPAC will represent the interests of chemistry in governmental and non-governmental forums.
2. IUPAC will contribute to the advancement of research in the chemical sciences throughout the world.
3. IUPAC will assist chemistry-related industry in its contributions to sustainable development, wealth creation, and improvement in the quality of life.
5. IUPAC will promote the service of chemistry to society in both developed and developing countries.

WORKSHOP, Coimbra, Portugal, 6-7 April 2001

Circular and website used to disseminate information on this workshop also sponsored by ICSU, the International Council for Science.




International Union of Pure and Applied Chemistry
International Council for Science

Workshop
on

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Hotel Meliá, Coimbra, Portugal

6-7 April 2001



Workshop Themes

Discussion focused on how to reduce the negative impact on the environment of industrial chemical processes and other fabrication procedures by using "cleaner" and more energy-efficient processes with recycling and by appropriate effluent treatment. Attention also focused on stored solid or liquid waste and remediation of contaminated sites resulting from pollution problems in the past. Particular themes are as follows:

- **soil and water remediation**
- **metal ion and organics removal**
- **recycling of process liquors and materials**
- **clean synthesis**
- **monitoring and sensors**
- **catalytic photochemical processes**

> 16 lectures, 41 posters and panel discussions

Workshop Participants

The workshop was directed toward:

- **specialists of international standing**
- **scientists from developing countries who will describe the particular problems their countries face**
- **researchers and students concerned with environmental problems**

> 77 attendees from 18 countries

An **introductory tutorial session** was organized the afternoon before the workshop.

Lecture Program

- Electrochemical reactors for environmental treatment and clean electrochemistry: electrode/membrane design and reactor characterisation
- Green synthesis via electrolysis in microemulsions
- Direct electrochemistry of redox proteins or enzymes at various film electrodes and their applications in monitoring or destroying some pollutants
- Strategies for environmental monitoring based on electrochemical sensors
- Development of biosensors for determination of mercury compounds and pesticides in waters and wastewaters
- New chemicals as potential inhibitors for copper corrosion
- Hydrodynamic voltammetry using a solid electrode for quantitative determination

- Photocatalytic degradation of organic pollutants at semiconductor/solution interface
- Photocatalytic and photo-induced superhydrophilic properties of TiO_2 coated substance: its application to environmental clean-up
- Effect of colloids on radionuclide migration in engineered barrier system and fractured rock system for performance assessment of high-level waste disposal in Japan
- Status of organochlorine (DDT) pollutants and steps toward electrocatalytic reductions
- From the laboratory to the pre-industrial pilot plant: electrochemical treatment of wastewater from a textile industry
- The action of hydrolyzing metal coagulants in water treatment
- Remediation of PAH-contaminated sludge by flotation
- Challenges to the development of new catalysts for "Green System" fuel cells
- Environmental remediation using electrons and photons: catalytic aspects and novel materials

Outcome

- Special journal issue planned for publication of proceedings
- Technical report for *Pure and Applied Chemistry*
- Report for *Chemistry International*

Task Group of the IUPAC Physical and Biophysical Chemistry Division:

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