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## An Outlook for Chemistry in Chile in 2000

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### Summary

This article surveys the history of chemistry in Chile as well as the current general aspects of research, human resources, graduate programs, and the main features of the Chilean Chemical Society.

### History

Science, in general, was not important during the colonial period in Chile. Chemistry, in particular, underwent little development, with its activity limited to sporadic analyses of water and minerals. Teaching of chemistry on a regular basis, as well as some rudimentary research, began with the arrival of the Polish scientist Ignacio Domeyko, who was hired by the Chilean government to teach chemistry and mineralogy. In 1838, Domeyko founded the first laboratory of chemical analysis at the Colegio de Coquimbo. Domeyko was aware that science was the basis for economic development, and he, therefore, stressed the theoretical and practical study of chemistry and physics. In his laboratory, he trained the first Chilean chemists, who later became the chemistry teachers of the next generations.

As the 19<sup>th</sup> century was drawing to a close, the Chilean government hired German scientists to teach and develop the basic sciences in the country. However, by that time chemistry was regarded solely as an ancillary discipline in the study of other specialties, such as engineering, medicine, or pharmacy. As recently as the early part of the 20<sup>th</sup> century, the situation had not changed appreciably; chemistry was still limited to a secondary role within the academic environment.

In the 1940s, even though a state policy for science was yet to be defined, the chemical community began to organize in small groups, mainly within the universities [1]. Thus in 1944, on the 25<sup>th</sup> anniversary of the Universidad de Concepción, the First Chilean Congress of Chemistry was held. At this congress, the bases for the future foundation of the Chilean Chemical Society were laid down, and the Society was officially established on 12 December 1946. The first issue of the Society's journal, the *Boletín de la Sociedad Chilena de Química*, ap-



**Prof. Ernest Eliel (right), on the occasion of his nomination as an Honorary Member of the Chilean Chemical Society, receiving the award from Prof. Guillermo Contreras, President of the Society, at the 23<sup>rd</sup> Chilean National Meeting held in Valdivia, 24–27 November 1999.**

peared in March 1950. In 1967, the National Commission for Scientific and Technological Research (CONICYT) was created with three goals: (1) to promote and fund scientific research, (2) to establish graduate programs at the universities, and (3) to devise national policies for scientific development. A remarkable impetus for scientific research grew with the establishment of graduate programs in the 1970s.

### Research

According to figures from the Institute for Scientific Information (ISI) [2], the Philadelphia-based institute that monitors scientific publishing trends, Chile produces more international papers per capita than Argentina and three times as many as Brazil and Mexico. The Chilean government spends about 0.67% of gross domestic product (GDP) on research—more than any other country in the region—yet far below developed countries such as the United States, Japan, or European countries that spend over 2% of GDP. As in most developing countries, the Chilean budget for research and development has been subject to large fluctuations throughout the country's history. Such budget variations denote the lack of a stable policy for science and technology in Chile, unlike the situation in more developed countries where a fairly stable budget is observed over time. This fact reveals that research, historically, has not been considered an important activity for the country.

The Chilean government supports peer-reviewed research through its National Commission for Scientific and Technological Research (CONICYT) [3]. CONICYT spends most of its budget on two funding programs: (1) the National Fund for Scientific and Technological Development (FONDECYT), which supports roughly 1 000 basic research projects for up to three years, and (2) the Fund for Fostering Scientific and Technological Development (FONDEF), which spends a roughly equal amount on projects with potential economic impact in priority areas such as mining, forestry, and agriculture. The government's participation in funding research has dropped since 1965 when it supported nearly 99% of research to a level of about 70% in 1997, mainly as a consequence of greater funding from industry. It is noteworthy that during this period, actual cash support of research by the government has increased; its lower percentage weight results from the appearance of alternative funding sources.

About 50% of the Chilean research budget goes to research universities, 25% is distributed throughout the country, and the rest is shared among government institutes and other institutions engaged in research. Government support accounts for nearly 95% of the funds devoted to research in the universities. Currently, around 95% of the R&D budget is devoted to basic and applied research; therefore, technological development is almost nonexistent. Since the establishment of FONDECYT in 1982, almost 7% of the total funds disbursed have been spent on chemistry research projects totaling 4 500 million pesos over the period 1982–1997.

One of the most important indices of R&D is productivity, namely, the number of original articles published in international journals. Although Latin American papers account for only about 1.8% of the total number of articles in the journals indexed by ISI, an analysis performed for *Science* [1] by ISI shows that since 1981 the Latin American share has risen substantially, from about 1.3% to the current level—an increase of 38.5%. Four countries—Brazil, Argentina, Mexico, and Chile—account for about 85% of the Latin American papers; the Chilean contribution to the Latin American total is 12%. The

number of articles published by Chilean authors in ISI-indexed journals has risen from 675 in 1981 to 1 489 in 1996—an increase that doubtless can be attributed to the FONDECYT program. In chemistry, these figures increased from about 50 in 1981 to about 200 at present, with an average relative impact factor for the period of nearly 0.5. Relative impact factor is a comparison parameter that measures the frequency of citations to scientific articles; the world average is set at 1.0 [4].

### Human Resources

Financial support and human resources are the bases for scientific and technological development. It is internationally accepted that the number of scientists and engineers is an important parameter to measure the status of science and technology. In Chile,

the number of researchers, scientists, and engineers is low whether it is expressed as an absolute number or as a fraction of the total population. Chile has about 1.2 scientific professionals per thousand inhabitants in contrast to developed countries, where this number varies between 4

and 9 per thousand. Most of these researchers, scientists, and engineers are in universities (about 70%), and the remainder are distributed in institutes (nearly 20%), and industry (10%). The total number of scientific professionals working in Chilean universities is about 4 400, with nearly 400 of them devoted to chemical research.

### Graduate Programs

Chile has five graduate programs [5] leading to a doctorate in chemistry; they are located at the Universidad de Chile (initiated in 1973), Pontificia Universidad Católica de Chile (1973), Universidad de Concepción (1975), Universidad de Santiago (1983), and Universidad Católica de Valparaíso (1983). These programs have similar admission requirements, which include the degree of Licenciado en Química or equivalent, two letters of recommendation, and an interview. To complete a doctoral program successfully, a student must pass 6–8 courses, a qualification examination in English, and a thesis presentation. The most important activity is the thesis, which must be an important and original contri-



Logo of the Chilean Chemical Society (SChQ)

bution to the development of an area of chemistry. The time required to complete the thesis varies between two and four years. Currently, all five Chilean doctoral programs are accredited by CONICYT, and financial support, via fellowships, comes from CONICYT, the Ministry of Education through the Improvement of High Teaching Quality Program (MECESUP), Fundación Andes, and the universities.

Since 1968, about 150 young Chilean scientists have received doctoral degrees in chemistry. Most of them have taken academic jobs; fewer than 20% have gone to industry.

### **The Chilean Chemical Society (SChQ)**

The Chilean Chemical Society (SChQ) was founded in 1946 to promote all areas of chemistry, as well as to advise educational and government authorities. The society is organized by Regions (*Regionales*) and Divisions (*Divisiones*). Regions are centers that comprise members within a single city; the five Regions are based in La Serena, Valparaíso, Santiago, Concepción, and Valdivia. Divisions, as in other chemical societies, group people with interests in a particular branch of chemistry. Each Division organizes periodic meetings, seminars, and workshops. The Divisions currently include Catalysis and Adsorption, Macromolecules, Chemical Education, Natural Products, Inorganic Chemistry, Analytical Chemistry, and Environmental Chemistry. Each Region and Division has its own President and Council, elected by its members. Membership for both is open to all chemists in the Society, which now has about 400 members.

The SChQ organizes and supports a broad range of activities to enhance public awareness and promote a positive image of chemistry through a strong program of public lectures, public symposia, exhibitions, posters, and booklets. Every year, the Chemical Education Division organizes the Olimpiadas de Química (Chemistry Contests) aimed at enhancing interest in chemistry among high school students. Students from all over the country participate in this event. The winners later compete in the Olimpiadas Iberoamericanas de Química (Iberoamerican Contests), which are held in a different Iberoamerican country each year.

The national meeting of the Society is the Jornadas Chilenas de Química, which takes place every two years and includes academic and industrial chemists from all over the country. Graduate students play an important role at these meetings, where they have the opportunity to report and discuss their research results with the national chemical community.

The Society publishes the *Boletín de la Sociedad Chilena de Química*, which is a quarterly journal

reporting original research in all areas of chemistry. Its first volume was published in March 1950, and its current volume is No. 45, whose first number was published in March 2000. The *Boletín* is indexed in *Current Contents* and the *Science Citation Index*, and it is currently one of the Iberoamerican journals with a high relative impact factor—quite an accomplishment for a Society as small as the SChQ. The *Boletín* is sent to all members of the Society. Currently, the SChQ web site is at <http://www.schq.cl>.

At present, the Chilean Chemical Society participates actively in several international scientific organizations, including the International Council for Science (ICSU), Federación Latinoamericana de Asociaciones Químicas (FLAQ), Pacific Basin Societies (PBS), and IUPAC. The SChQ maintains permanent exchange programs with the American Chemical Society (ACS), as well.

### **Closing Remarks**

The most important goals of the SChQ are to enhance awareness of the importance of science in general and of chemistry in particular in everyday life. This message must be brought home at three different levels. First, and most important, it must reach the younger generation of Chileans, represented by pre-high school students. Second, government authorities must also be included in the scheme. Finally, the public at large needs to accept the inherent need for and benefit of science in the contemporary world. The general population also needs to consider large numbers of scientists and institutions doing research as a reason for national pride and not as a bothersome liability.

Many problems and obstacles remain, but the achievement of the national chemical community in the last 50 years leads us to regard the future of chemistry in Chile with sound optimism.

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# IUPAC Prize for Young Chemists

## Winners of the 2000 Prize

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Winners of the 2000 IUPAC Prize for Young Chemists, as announced recently, are Alberto Credi, Università di Bologna, Italy; Hiroyuki Isobe, University of Tokyo, Japan; Vijaya J. Patil, National Chemical Laboratory, Pune, India (currently with Hindustan Lever Research Centre, Bangalore, India); and Chandra Saravanan, University of Massachusetts, Amherst, Massachusetts, USA (currently at the University of California, Berkeley). The four winners will each receive a cash prize of USD 1 000 and a free trip to the IUPAC Congress, 1–6 July 2001, Brisbane, Australia. Each prize winner will also present a poster at the IUPAC Congress describing his/her award-winning work.

The IUPAC Prize was initiated this year for the best Ph.D. thesis in the chemical sciences, as described in a 1 000-word essay. The essays describing the winners' theses can be found on the IUPAC web site ([http://www.iupac.org/news/prize/2000\\_winners.html](http://www.iupac.org/news/prize/2000_winners.html)) and cover a wide range of subject matter: Dr. Credi, "Molecular-Level Machines and Logic Gates"; Dr. Isobe, "Design and Synthesis of DNA Binding Organofullerene"; Dr. Patil, "Electrostatically Controlled Formation of Nanocomposite Thin Films with Organic Matrices"; Dr. Saravanan, "Physical Chemistry of Organic Molecules in Nanoporous Materials".

There were 59 applicants from 24 countries. The Prize Selection Committee comprised Members of the IUPAC Bureau with a wide range of expertise in chemistry. The Committee was chaired by Dr. Joshua Jortner, Professor of Chemistry at Tel Aviv University and Past President of IUPAC. Prof. Jortner commented on the high quality of the applications and said, "I am very happy with the results. The IUPAC Prize will constitute a significant contribution to the standards of international chemical sciences and to the image of IUPAC."

In view of the quality of many applications, the Committee decided also to give five Honorable Mention awards to Tamara V. Basova, Institute of Inorganic Chemistry, Siberian Branch of the Russian Academy of Science, Novosibirsk, Russia; Olivier P. Haefliger, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland (currently with Firmenich SA, Geneva, Switzerland); Harri Hakala, University of Turku, Finland; Mallela M. G. Krishna, Tata Institute of Fundamental Research, Mumbai, India (currently at the University of Pennsylvania

School of Medicine, Philadelphia, Pennsylvania, USA); and Joselito P. Quirino, Himeji Institute of Technology, Kamigori, Japan (currently at Stanford University, Palo Alto, California, USA). The Honorable Mention Award winners will receive a cash prize of USD 100 and a copy of the *Compendium of Chemical Terminology*, the IUPAC "Gold Book".

The awards to the four winners of the IUPAC 2000 Prize and the winners of the IUPAC 2001 Prize will be made during the Grand Opening session of the IUPAC Congress in Brisbane, Australia. Applications for the 2001 Prize are now being solicited, as described below.

## Announcement of the 2001 Prize

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The IUPAC Prize for Young Chemists has been established to encourage outstanding young research scientists at the beginning of their careers. The prize will be given for the most outstanding Ph.D. thesis in the general area of the chemical sciences, as described in a 1 000-word essay.

IUPAC will award up to four prizes annually. Each prize will consist of USD 1 000 cash and travel expenses to the next IUPAC Congress. In keeping with IUPAC's status as a global organization, efforts will be made to assure fair geographic distribution of prizes.

Prizes will be presented biennially at the IUPAC Congress (next Congress: 1–6 July 2001, Brisbane, Australia). Each awardee will be invited to present a poster on his/her research and to participate in a plenary award session.

Applications must be submitted, as described below, to the IUPAC Secretariat. In addition, some IUPAC National Adhering Organizations are soliciting applications in their own countries, frequently in conjunction with a national award. In such cases, applications may be submitted to the NAO or to the Secretariat (not both). A list of participating countries is given on the IUPAC web site, <http://www.iupac.org/news/prize.html>.

Applications will be judged by a committee of eminent scientists appointed by the President of IUPAC.

## Procedures for the 2001 Prize

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a. Entrants must have received their Ph.D. (or equivalent) degree, or completed all Ph.D. requirements including successful defense of the

- doctoral thesis, during calendar 2000 in any of the 60 countries that are Members or Associate Members of IUPAC. Entrants need not be citizens or residents of one of these countries at the time the application is submitted.
- b. The research described in the entrant's thesis must be in the field of the chemical sciences, defined as "chemistry and those disciplines and technologies that make significant use of chemistry."
  - c. The IUPAC Prize recognizes only work that was performed while the entrant was a graduate student.
  - d. Application requires submission of a completed entry form (available on the IUPAC web site at <http://www.iupac.org/news/prize.html>), together with the material listed in items *e* and *f*. The entry form and supporting material should be submitted by e-mail whenever feasible. Additional material may be sent as needed by fax or mail.
  - e. An essay must be submitted by the entrant that describes his or her thesis work and places it in perspective relative to current research in the chemical sciences. The essay must be written in English by the entrant and may not exceed 1 000 words. (For applications submitted through NAOs, a national language may be permissible, and the NAO will assist in translation to English. The announcement by the appropriate NAO should be consulted.)
  - f. Two supporting letters (sent by e-mail if feasible) are required from the thesis adviser and/or chairman of the thesis committee and one additional faculty member. These letters should comment on the qualifications and accomplishments of the applicant and the significance of the thesis work.
  - g. Complete applications must be received at the IUPAC Secretariat by 1 February 2001. If submitted through an IUPAC National Adhering Organization or Associate NAO, the deadline established by the NAO must be met. Early submission is strongly encouraged so that any questions may be resolved before the deadline date.
- Visit the IUPAC web site at <http://www.iupac.org/news/prize.html> for complete information and an application form.

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## Air Quality in Denmark

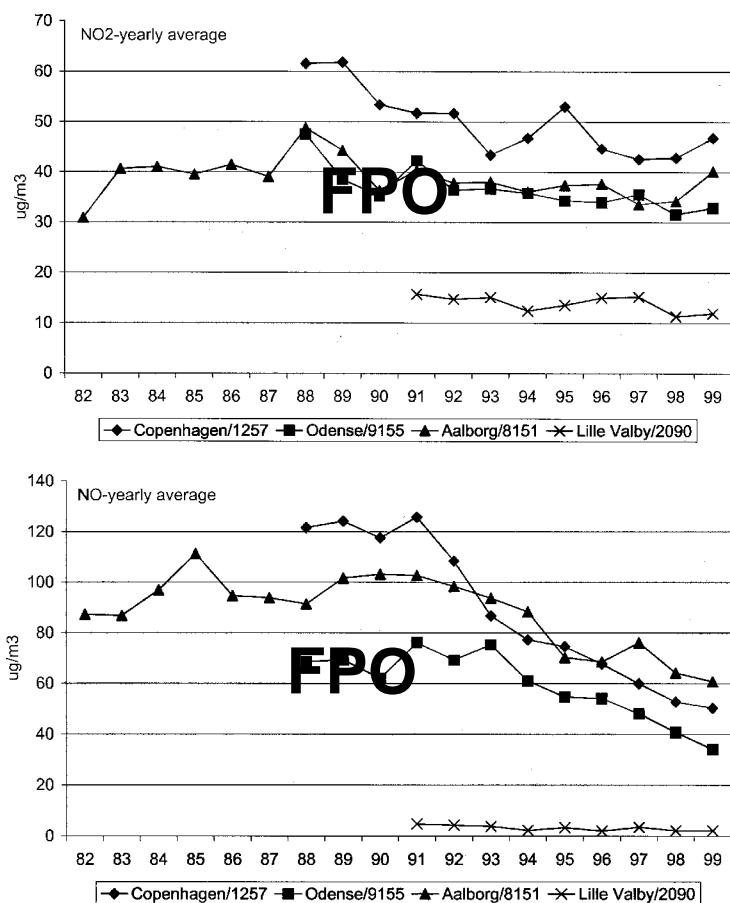
This article is one in a series by IUPAC's Commission on Atmospheric Chemistry (VI.2) about air quality in IUPAC member countries. It was contributed by Ole Hertel (E-mail: [Ole.Hertel@dmu.dk](mailto:Ole.Hertel@dmu.dk); Tel.: +45 4630 1148; Fax: +45 4630 1214; Web site: [www.dmu.dk/AtmosphericEnvironment/netw.htm](http://www.dmu.dk/AtmosphericEnvironment/netw.htm)), Finn Palmgren, Thomas Ellermann, Henrik Skov, Kåre Kemp, Mads F. Hovmand, and Jørgen Brandt of the National Environmental Research Institute, Department of Atmospheric Environment, P.O. Box 358, Frederiksborgvej 399, 4000 Roskilde, Denmark.

Denmark is situated in Northern Europe in a generally cool, windy, and moist coastal climate. Air pollution levels are usually moderate compared with Southern and Eastern Europe, which have higher emission densities and more intense photochemical activity. However, the environmental impact of air pollution still gives rise to concern, principally because of health effects owing to human exposure to fine and ultrafine particles. Other issues include nitrogen deposition that contributes to eutrophication of coastal waters, damage to sensitive terrestrial ecosystems owing to atmospheric deposition of nutrients and acidifying compounds, and ozone stress.

Air quality monitoring is carried out within the Danish Urban Air Quality Monitoring Program [1]

and the Nationwide Danish Monitoring Program [2] for air quality in the rural areas. Data from these programs can be accessed from the following web site: [www.dmu.dk/AtmosphericEnvironment/netw.htm](http://www.dmu.dk/AtmosphericEnvironment/netw.htm). Current guidelines are not exceeded in Danish cities, and future European Union (EU) guidelines are expected to be met as well [3]. Measurements are supplemented with model calculations, and recently this effort has been extended with an operational Danish air pollution forecasting system, THOR [4], from which results are also accessible on the Internet.

The Danish urban monitoring program was established in 1982, and it currently comprises a network with stations in three cities (a fourth city will soon be included). Monitoring is carried out through cooperation among the Danish Environmental Protection Agency, the National Environmental Research Institute (NERI), the Greater Copenhagen Air Monitoring Unit, and the municipal authorities in the cities of Odense and Aalborg. NERI is responsible for operating the program together with the Agency of Environmental Protection of Copenhagen, the Environmental and Food Control Agency of Funen, and the Department for the Environment and Urban Affairs of Aalborg. Data are published in quarterly reports in Danish and are summarized in an-



**Fig. 1 Concentrations of nitrogen oxides at Danish Urban Air Quality stations from 1982 to 1999.**

nual reports in English [1]. Data are also available on the Internet.

Various actions have had a pronounced positive effect on urban air quality in Danish cities. Lead pollution has been reduced by a factor of about 50 since 1982 as a result of the removal of lead from gasoline. A reduction of benzene content in gasoline from approximately 3.5% in 1994 to around 1% in 1998, together with the introduction of Three-Way Catalytic (TWC) converters, led to a substantial reduction in ambient benzene concentrations, as revealed in a recently concluded personal exposure study on benzene [5]. The introduction of TWC has, in general, reduced emissions of hydrocarbons, nitrogen oxides, and carbon monoxide from individual passenger cars considerably (typically about 90%). Based on actual kilometers traveled, the percentage of gasoline cars having TWC is estimated to be about 67%. This reduction is evident in the observed trends in nitrogen monoxide (NO) from the monitoring stations (Fig. 1), whereas the trend for the more harmful nitrogen dioxide ( $\text{NO}_2$ ) is much less pronounced. In vehicle exhaust, NO usually accounts for about

90 to 95% of the nitrogen oxide ( $\text{NO} + \text{NO}_2$ ) emissions, but  $\text{NO}_2$  is formed in a rapid reaction between NO and ozone in ambient air, usually with ozone as the limiting factor for  $\text{NO}_2$  formation in streets. Ambient ozone is mainly a result of long-range transport from Central and Eastern Europe, and local emission reduction strategies have, therefore, had only limited effect on  $\text{NO}_2$  concentrations in streets in Danish cities. Impact studies of the new EU vehicle emission standards show that air quality in Danish cities will improve further [3].

Concentrations of total suspended particulate (TSP) matter have also decreased, partly as a result of reduced sulfur emissions. There are indications, however, that health effects may be related to fine and ultrafine particles rather than to particle mass. Various research activities have, therefore, been initiated to explore the characteristics (size, distributions, chemical compositions, etc.) of particle pollution in urban areas, and thereby to provide the tools for determining the most efficient reduction strategies [6,7].

The Nationwide Danish Background Monitoring Program was established in 1989, and results are reported annually [2,8]. The program assembles information on nutrient input to the Danish aquatic and forest ecosystems. Turnovers are frequently observed in Danish coastal waters and lead in worst-case situations to the death of fish and benthic fauna. Air quality and precipitation measurements are currently performed at eight locations selected to represent coastal and island-based areas, as well as inland areas. At all sites, bulk collectors capture precipitation over semimonthly periods. The samples are analyzed for their content of nutrients and metal ions. Furthermore, six stations are equipped with filter pack samplers to collect compounds in the gas and particle phases.

In the later years, a decrease in atmospheric nitrogen concentrations is evident from the observations (Fig. 2). A similar tendency has been observed for wet depositions, although the decrease is less pronounced, owing to dependency on the precipitation amount. Atmospheric nitrogen deposition to coastal waters, however, contributes significantly to the overall loads. For inner Danish waters, estimates have shown that the atmosphere contributes about

30 to 40% of the total nitrogen loads.

The measurements in Danish monitoring programs are supplemented by model calculations. In the urban monitoring program, calculations with the carefully validated Operational Street Pollution Model (OSPM) [9] allow for estimates of concentration levels in streets without monitoring, and make it possible to evaluate the effects of various actions toward reduction of pollution from urban traffic. In the background monitoring program, the Atmospheric Chemistry and Deposition (ACDEP) [10] model is used to study the geographical distribution of nitrogen deposition to Danish marine waters, and to evaluate source-receptor relationships.

Data from THOR [4] have recently been released on the Internet. THOR is an integrated modeling system based on weather forecasts from the ETA model [11], on air pollution forecasts derived from a long-range transport pollution model known as the Danish Eulerian Operational Model (DEOM), on the Urban Background Pollution Model (UBM), and on the Operational Street Pollution Model (OSPM).

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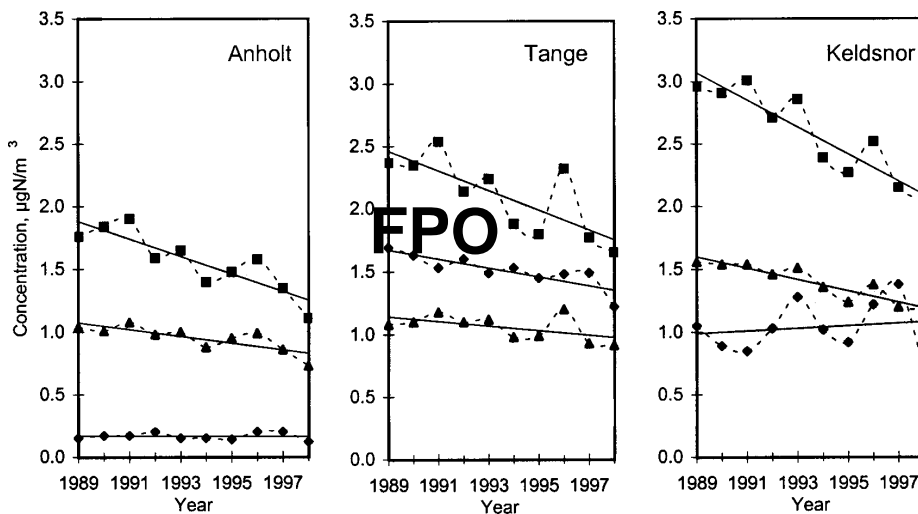


Fig. 2 Annual mean concentrations of ammonia (◆), particle phase ammonium (■), and the sum of nitric acid and nitrate (▲) from the monitoring stations on the island Anholt, and at Tange and Keldsnor for the years 1989 to 1998.

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## Highlights from the Web

### e-news from [www.iupac.org](http://www.iupac.org)

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It seems like yesterday that the IUPAC web site was about eight pages, and back then it was easy to keep up with new developments. For the last two years, we have enhanced the information made available to you via this new medium. We still have plenty of ideas to improve the site, and, as someone once said, "the best is yet to come!" We feel, however, that it is now time to reach out to you by e-mail to let you know what's new at IUPAC and its web site. So, here it is; on 28 June 2000, we sent the first IUPAC e-news, an e-mail newsletter about IUPAC and its web site, to about 1 200 persons, the combination of all of our different mailing lists. Unfortunately, this initial mailing list does not include all the current readers of *Chemistry International*. If you are inter-

ested in joining this list and did not receive the first e-mail, please visit <http://www.iupac.org/news/e-news.html>. From that page, you can take a look at the first message and subscribe if you want. This mailing group is not restricted to IUPAC, and anyone can join. If you think that a friend or colleague might find IUPAC e-news useful, don't forget to pass them the address.

For questions regarding the list, including how to subscribe or unsubscribe, where to submit an item, or to report a problem, visit the e-news page at <http://www.iupac.org/news/e-news.html>.

E-mail your suggestions, comments, questions, etc., to [fabienne@iupac.org](mailto:fabienne@iupac.org). See you online!

**Fabienne Meyers**  
**IUPAC Secretariat**

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## Reports from IUPAC-Sponsored Symposia

### Chemistry and the Internet, 25–27 September 1999, Washington, DC, USA

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This conference was the second in a series of annual meetings; the web site is at <http://www.chemint.org>. In 1999, there were five sessions on electronic ("e-") issues, including e-commerce, e-publishing, education, corporate Internet and intranet strategy, and databases. The first, second, and fourth sessions were followed by lively discussions led by a panel of experts. Bill Town of ChemWeb opened the first session, explaining why so many companies are rushing into e-commerce. Despite the costs (up to USD 40 million to set up a storefront) and the current unprofitability of most ventures, the long-term gains could be tremendous. "E-commerce is not easy, it's not cheap, and it's *not optional*".

In the publishing arena, first, Chris Parkinson, Environmental Molecular Sciences Laboratory (EMSL), demonstrated the EMSL Desktop, a new collaborative authoring environment that allows multiple users in different, geographically remote institutions, to read and write multiple documents, on multiple heterogeneous platforms. EMSL Desktop has moved away from applet technology and is now more like a "desktop" on a desktop, allowing "drag and drop", and application launching.

Bob Bovenschulte of ACS Publications answered ten big questions about e-journals:

- Does electronic publishing reduce costs?
- Is faster better?
- How should the electronic archive be maintained?
- What is the outlook for pricing models?
- Who should own the copyright to journal articles?
- Should all the sciences adopt the preprint/e-print model?
- Should peer review be redefined?
- Who should link to whom, and how?
- Will secondary publishers become obsolete?
- What is the government's proper role in scientific publishing?

Steven Bachrach of Trinity University gave a progress report on the *Internet Journal of Chemistry (IJC)*. Targets include full incorporation of multimedia, promotion of Internet technologies, low cost, and liberal copyright policies. *IJC* is peer-reviewed and covers all areas of chemistry.

In the education session, Donald DeCoste described web-based homework assignments at the University of Illinois at Urbana-Champaign, Karl Harrison demonstrated the incorporation of multimedia into courseware at the University of Oxford, and Lon Mathias showed how the Polymer Science Learning Center at the University of Southern Mis-



Mississippi web site makes polymer information free and fun. Robert Lancashire's site at the University of the West Indies gets many visitors because it is the home of the JCAMP-DX data viewer for Windows. Lancashire discussed interactive web page development with Chime and Java. Alan Arnold of the Australian Defence Force Academy talked about MetaChem, a web gateway to international print and electronic sources of chemical information. Sites are evaluated, described, classified, and indexed, and a database of metadata has been set up.

Yvonne Martin of Abbott Laboratories was the first speaker in the corporate intranet program. She is developing a web tool that enables bench chemists to discover structure–property–activity relationships. ChemSymphony “Beans”, from Cherwell Scientific, are being used. Lewis Jardine, of Cherwell, talked about these Java beans in a later session. Tom Pierce's talk concerned web culture at Rohm and Haas, while Achim Zielesny described the impressive integrated chemistry system that has been built on the Bayer intranet.

On the final day, Stephen Boyer of IBM described an intellectual property “infobank” based on IBM's patent services on the Net; one of them is free, and the other, a “Gold” site, is for paid use by businesses. IBM also offers data mining and visualization tools. Next, Gary Mallard of the U.S. National Institute of Standards and Technology (NIST) talked about the NIST Chemistry WebBook and the (free) use of chemistry reference data on the web. It was interesting to relate this talk to an earlier one on database protection by Jerome Reichman of Vanderbilt University, School of Law. Reichman is anxious to encourage the “sharing ethos”, and he fears that database protection could impede the progress of science and innovation.

In the final presentation (coauthored by Wolf-Dietrich Ihlenfeldt and Frank Oellien at the University of Erlangen-Nürnberg), Marc Nicklaus of the U.S. National Cancer Institute (NCI) demonstrated the enhanced “CACTVS” software for browsing the open NCI database. A free Internet system, called Erlangen/Bethesda Data and Online Services, offers sophisticated facilities, including chemical structure handling, and 3D pharmacophore search.

The conference attendance was not so large as to discourage networking and audience participation, yet countries from East and

West and from both hemispheres were represented. A detailed record of the Proceedings, with links to related web sites, is available at <http://www.warr.com/chemnt99.html>.

Chemistry and the Internet (ChemInt2000) will be held again 23–26 September 2000 at Georgetown University, Washington, DC, USA (see <http://www.chemint.org/>).

**Dr. Wendy A. Warr**  
**Wendy Warr & Associates, Cheshire, England, UK**  
**Chairman, IUPAC Committee on Printed and Electronic Publications (CPEP)**

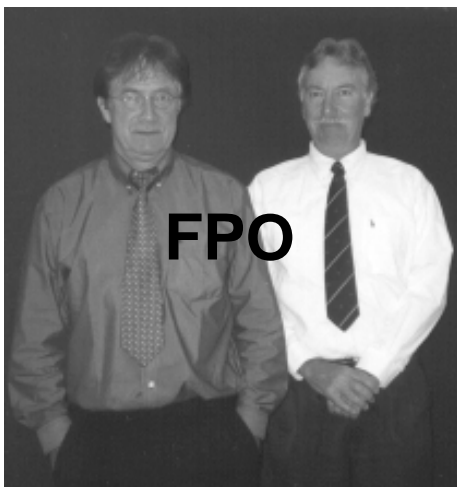
**UNESCO Preconference Workshop,  
8–9 April 2000, and UNESCO School  
and IUPAC Conference on  
Macromolecules and Materials Science,  
10–12 April 2000,  
Matieland, South Africa**

This collaboration between UNESCO and IUPAC, organized by Prof. Ron Sanderson of the University of Stellenbosch, Matieland, South Africa (E-mail: [rsd@land.sun.ac.za](mailto:rsd@land.sun.ac.za)), attracted 160 attendees, of whom 66 came from countries other than South Africa. Good representation from the African continent included delegates from Zimbabwe, Kenya, Botswana, Namibia, Lesotho, and Nigeria. The large number of students who actively participated in the weeklong proceedings was most gratifying.

At the UNESCO Preconference Workshop, 1 local speaker and 17 international speakers presented informative lectures on introduction to polymers,



University of Stellenbosch campus, Matieland, South Africa



**Prof. J. C. Jansen and R. D. Sanderson**

chain polymerization reactions, polymer degradation and stabilization, polymer recycling, and analysis and characterization of polymers.

Prof. P. S. Steyn, IUPAC Vice President, opened the UNESCO School and IUPAC Conference with greetings from IUPAC, and he was followed by 24 plenary lecturers from 10 countries. Scientists from another 3 countries presented invited talks. Highlights of the conference included the following:

- excellent work on plastics recycling, described by Dr. Hans Zweifel from Basel, Switzerland;
- a new stopflow kinetic device developed by Prof. Minoru Terano of the Advanced Institute of Science and Technology in Japan for measuring reaction kinetics in Ziegler-Natta and metallocene polymerizations;
- an excellent overview of self-assembly nanomaterials given by Prof. Samuel I. Stupp of Northwestern University, Evanston, Illinois, USA, followed by a thermodynamic prediction of nanostructure synthesis by Dr. Lionel Vayssieres of Dr. Anders Hagfeldt's research group at Uppsala University, Sweden;
- a description of new colloidal copying of organic structures by Prof. R. D. Sanderson and Charl Faul of Stellenbosch University in collaboration with Prof. Dr. Markus Antonietti of Max-Planck-Institut in Golm, Germany;
- a discussion by Dr. Ioan Tincul of Sasol Technology, Modderfontein, South Africa, of the newer polyolefins, synthesized by Ziegler Natta, and the new propene pentene copolymer with low haze currently being commercialized by the Sasol subsidiary Polifin;
- a fine overview of the newest findings on "living-free" radical polymerizations presented by the group of Dr. Bert Klumperman (Eindhoven University of Technology, Netherlands), Axel

Müller (University of Bayreuth, Germany), Stefan Bon (University of Warwick, England, UK), and San Thang (CSIRO, Australia); and

- an exciting discussion of new techniques for materials processing with supercritical fluids, with emphasis on applications to polymers, presented by Prof. Gerda van Rosmalen of Delft University, Netherlands.

Concluding remarks given by top technical people from industry included summaries of the following topics:

- South African coatings technology priorities (Dr. Boyd Cooray, Plascon Paints, Johannesburg, South Africa);
- quietly improving the quality of life (Bryan Webster, Rohm & Haas, South Africa);
- acrylic emulsion polymers for future paints (R. Baumstark, BASF AG, Germany);
- Revertex's development needs (Technical Director, Revertex, South Africa); and
- Polifin's technology goals (Mrs. Karol Camerol, Polifin, Modderfontein, South Africa).

In concluding, the group stressed the importance of training in polymer science and chemistry in South Africa at the postgraduate level to the South African economy and the associated need to establish technical competencies. The overseas plenary speakers were very agreeable to assist thereby in augmenting the goals of UNESCO and IUPAC. The conference banquet at the famous Boschendal wine estate, close to Franschoek, was greatly enjoyed by all who attended it.

A virtual encyclopedic CD-ROM that incorporates the abstracts and overheads given by all the plenary speakers at both the School and Conference has been created. This CD-ROM provides an excellent tool for teaching and expanding course notes and was made available to all delegates. It is also available at USD 50 a copy through the Institute for Polymer Science Conference web site, <http://www.sun.ac.za/polymer/polymer.html>. It will be placed in an abridged form on the web site after approval by each of the contributors.

Announcements of the 2001 (4<sup>th</sup>, Johannesburg) and 2002 (5<sup>th</sup>, Stellenbosch) conferences appear on pages 153 and 155, respectively, of this issue.

**Prof. P. S. Steyn**  
**IUPAC Vice President**  
**Prof. R. D. Sanderson**  
**Conference Chair**  
**University of Stellenbosch**  
**Matieland, South Africa**

## 10<sup>th</sup> International IUPAC Conference on High-Temperature Materials Chemistry (HTMC-X), 10–14 April 2000, Jülich, Germany

The IUPAC conferences on High-Temperature Materials Chemistry were initiated by the Inorganic Division's Commission on High-Temperature Materials and Solid State Chemistry (II.3) in 1977 and have become the premier international venue for exploring the combination of chemistry and materials science as these affect understanding, production, and use of high-temperature materials. As part of its service to the high-temperature and materials chemistry communities, IUPAC Commission II.3 has provided overall organization and continuity of the series, along with selection, coordination, and guidance of the individual-conference local organizers. This tenth conference in the series was held 10–14 April 2000 in Jülich, Germany. It was organized by Prof. Klaus Hilpert of the Forschungszentrum Jülich with the help of F. Froben and L. Singheiser. The Jülich conference provided significant opportunities for productive interchange between basic and applied researchers, with particular emphasis on applications of thermodynamics, of modern diagnostics, and of corrosion studies to the high-temperature processing and chemical behavior of bulk materials and coatings, and to high-temperature light sources.

There were about 250 papers and 250 participants from 26 countries at this highly successful, fully subscribed meeting. International participation was facilitated by a generous grant from the German Science Foundation to support attendance by scientists from the former "East". To ensure productive dialog between basic science and applications—and among industrial, research laboratory, and academic scientists—the conference, following tradition, was held with no parallel sessions and with lots of opportunities for formal and informal discussion. The majority of the papers were presented in poster sessions. In addition, there were 7 invited lectures, 17 keynote lectures, 41 shorter oral presentations, and 7 hands-on demonstrations of computerized thermodynamic databases.

Main lectures to be published in a future issue of *Pure and Applied Chemistry* introduced the following different topics and sessions: hydrocarbon oxidation

kinetics (J. Warnatz, IWR, Heidelberg, Germany); laser vaporization for mass spectrometric studies at 3000–5000 K (J. Hastie, NIST, Gaithersburg, Maryland, USA); containerless levitation methods to produce and study high-temperature liquids (P. Nordine, Containerless Research, Evanston, Illinois, USA); thermodynamic models for use in computer databases (M. Hillert, KTH, Stockholm, Sweden); transport processes between the 1000 K wall and the 3600

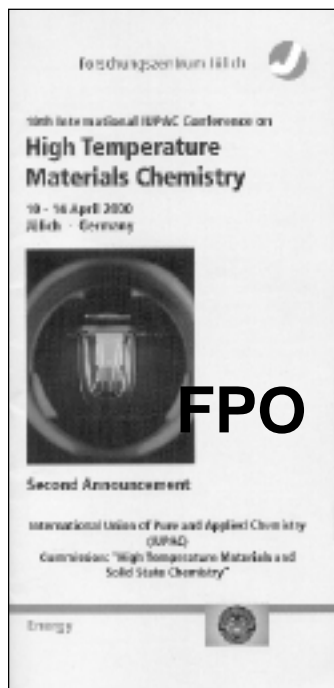
K electrode in metal halide gas discharge lamps (W. van Erk, Phillips, Eindhoven, Netherlands); analysis of kinetic processes at solid–solid interfaces (H. Schmalzried, University of Hannover, Germany); and applications of chemical vapor deposition to produce tailored structural coatings (G. Wahl, Technical University Braunschweig, Braunschweig, Germany).

Keynote lectures by leaders of their fields comprised presentations discussing and using varied techniques, including high-temperature mass spectrometry, molecular beam sampling, electric-field activated combustion synthesis, synchrotron X-ray studies of levitated liquids, and gas-phase electron diffraction determination of molecular structure; a number of forefront experimental and modeling studies of ceramic materials and oxides; and studies of alloys, fullerenes, carbon

nanotubes, and fuel cells. These papers, along with the other oral and poster presentations, illustrated the tremendous variety of physical and chemical techniques that are utilized, and of systems—technological and basic—that are studied under the umbrella of "high-temperature materials".

The two meetings that immediately preceded HTMC-X in this well-established and successful IUPAC series were in State College, Pennsylvania, USA (1997) and Vienna, Austria (1994). Following a pattern of meeting every three years on a different continent, the next conference, HTMC-XI, is scheduled for 2003. It will be held in Asia for the first time, in Tokyo, Japan, hosted by Michio Yamawaki of the University of Tokyo (yamawaki@q.t.u-tokyo.ac.jp).

**Dr. Gerd M. Rosenblatt**  
Vice President, IUPAC Inorganic Chemistry Division (II)  
Lawrence Berkeley National Laboratory  
University of California, Berkeley

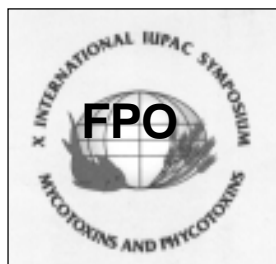


FPO

10<sup>th</sup> International IUPAC Symposium on  
Mycotoxins and Phycotoxins  
(10<sup>th</sup> ISMP), 21–25 May 2000,  
Guarujá, São Paulo, Brazil

This series of conferences was initiated by the IUPAC Commission on Food (VI.5), and the first symposium was held in Kungälv, Sweden in 1973. Some eight symposia have taken place in subsequent years in venues as diverse as Pretoria, Tokyo, Mexico, and Rome. The meetings have developed a considerable reputation for the high quality of interdisciplinary scientific contributions, and they have become the principal international meetings on mycotoxins and phycotoxins. This tenth meeting in the series, which further enhanced this reputation, was held 21–25 May 2000 at the seaside resort of Guarujá near São Paulo, Brazil. The symposium was organized by the Instituto Adolfo Lutz (with the National Organizing Committee chaired by Dr. Myrna Sabino) and attracted some 306 participants from 57 countries.

The program was organized on the basis of a plenary session on mycotoxins and phycotoxins on the first day, followed by parallel sessions on subsequent days. In total, there were 61 oral contributions and 212 posters, with an accompanying small scientific manufacturers exhibition. The truly interdisciplinary nature of the symposium can be seen from the program, which covered global significance of mycotoxins and phycotoxins, analytical developments, quality assurance, proficiency testing, methods validation, sampling, risk assessment, occurrence and human exposure, toxicology, and mode of action. A significant proportion of the participants were from developing countries, and a roundtable on “Analytical methods for developing countries” and a session on “Research on mycotoxins in developing countries” were aimed at meeting their needs. In addition, an FAO-sponsored Analytical Quality Assurance Workshop for mycotoxins for Latin American participants preceded the symposium. The symposium program also included a roundtable on “Nomenclature for phycotoxins”, where the issue of novel phycotoxins—currently being identified with increasing frequency, yet being trivially and nonsystematically named—was recognized as a source of confusion and an area in which IUPAC should take a lead. It was, therefore, proposed that an Interdivisional Working Group on Nomenclature for Phycotoxins be established.



**Organizing Committee of the 10<sup>th</sup> ISMP, left to right, seated: J. Gilbert, M. Sabino, B. Correa, and D. Rodriguez-Amaya; standing: W. de Koe and H. P. van Egmond.**

A special committee selected the best oral presentation given at the symposium, awarding the “ILSI Brazil Award”—consisting of a certificate and USD 1 000—to Dr. V. Sewram from PROMEC, South Africa for his paper on “Hair: A noninvasive matrix for assessing chronic exposure to fumonisin mycotoxins”. The best poster presented at the symposium was recognized by the “BRASEQ Award”, consisting of a certificate and USD 500, which went to Dr. L. P. Keong of DSO National Laboratories, Singapore for a poster on “The determination of domoic acid in aqueous samples using a solid-phase microextraction technique coupled to liquid chromatography”. Proceedings of the symposium, comprising the oral contributions, will be edited by Willem de Koe and published before the end of 2000; copies can be ordered from [wjdekoe@bird.nl](mailto:wjdekoe@bird.nl) at a cost of USD 60.

The Commission on Food (VI.5) will be disbanded by the time of the next symposium, owing to the upcoming restructuring of IUPAC. In order, therefore, to ensure continuance of this important series of meetings, it was proposed that future meetings be cosponsored by AOAC International and that the 11<sup>th</sup> Symposium be held at the University of Maryland (College Park, Maryland, USA) in 2003 or 2004.

**Prof. John Gilbert**  
**Chairman, IUPAC Commission on Food (VI.5)**  
**Ministry of Agriculture, Fisheries, and Food**  
**Central Science Laboratory**  
**Sand Hutton, York, England, UK**

## 9<sup>th</sup> International Conference on Polymer-Based Technology (POC'2000), 21–26 May 2000, Tianjin, China

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This conference has a long and distinguished history, with its original focus on reactions of polymer-supported catalysts. It now covers a wide range of topics in high-tech applications of polymers. The Tianjin meeting followed the fine tradition of preceding ones. There were about 150 participants from about 15 countries; half of the participants were from the host country. The standard of plenary and contributed papers (including some excellent presenta-

tions from young Chinese scientists) was exemplary. POC'2000 is the first in the series of these meetings to be sponsored by IUPAC, and, we hope, not the last. It represents one of many instances where Chinese scientists support the goals of the Union for the promotion of international chemical science and technology.

**Prof. Robert G. Gilbert**  
**President, IUPAC Macromolecular Division (IV)**  
**University of Sydney**  
**New South Wales, Australia**

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## New Projects

Visit <http://www.iupac.org/projects/> for complete information and further links.

### Round-Robin Test on the Molecular Characterization of Epoxy Resins by Liquid Chromatography

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Epoxy resins are an important group of synthetic resins with many application areas. Thus far, only relatively primitive analytical tests have been used for routine characterization of epoxy resins. The simple characteristics are often unable to discriminate between different samples, to find structure vs. properties relations, and to evaluate production reproducibility. Liquid-chromatographic characterization of epoxy resins has been reported in the literature, but no standard procedure has been established and no systematic study of the results obtained in different laboratories has been reported.

IUPAC has approved a project to run a round-robin test on the analysis of epoxy resins by liquid chromatography. Two different samples of solid bisphenol A-based epoxy resins are intended to be analyzed by conventional size exclusion chromatography (SEC), SEC coupled with a light-scattering detector or a viscometer, and high-performance liquid chromatography (HPLC). Participants in the test can choose to employ only one of the methods mentioned or to use all of them. Participants from research as well as production plant laboratories are welcome, and the requirements for the samples should be addressed to Martin Kaska, SYNPO, S. K. Neumann 1316, 532 07 Pardubice, Czech Republic, Tel.: +420 40 6304021; Fax: +420 40 6303333; E-mail: [podzimek@pce.czn.cz](mailto:podzimek@pce.czn.cz).

See [http://www.iupac.org/divisions/current\\_projects/2000/990211\\_400\\_00.html](http://www.iupac.org/divisions/current_projects/2000/990211_400_00.html) for project description and update.

### Polyaniline: Recommendations for Preparation of Conducting Polymer and Its Colloidal Form

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An ever-growing number of papers reflects the increasing interest in conducting polymers [1], in their processing, and in the studies of their specific forms, such as colloidal dispersions [2].

Conducting polymers belong to a family of synthetic metals, of which polyaniline is a typical representative. The inherent properties of polyaniline—polymer character, color, and electrical conductivity—in connection with the organic nature, predetermine links to the semiconductor physics; macromolecular, physical, and organic chemistry; and to analytical and materials sciences. Conducting polymers behave in an “intelligent” manner; that is, they respond to various external stimuli (temperature, humidity, presence of gases and vapors, acidity, oxidation, and reduction) by changing their electrical, optical, and chemical properties. They are used in sensing, detection, and various monitoring devices, as well as in the design of new materials.

This collaborative project, supported by IUPAC's Macromolecular Division (IV), has two basic goals. The first one is to define a simple protocol for the preparation of polyaniline, which, if followed, results in a product that has well-defined properties. Because colloidal dispersions of conducting polymers are important for their processing, the project will then establish the reaction conditions that lead to polyaniline that is colloidally soluble in aqueous media. This project is being coordinated by Prof. Jaroslav Stejskal, a National Representative of IUPAC's Commission on Polymer Characterization

and Properties (IV.2), with participation of other members of the Commission. Any comments and suggestions are welcome and should be sent to the project coordinator, Dr. Jaroslav Stejskal, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, 162 06 Prague 6, Czech Republic. Tel.: +42 02 2040 3351; Fax: +42 02 367 981; E-mail: stejskal@imc.cas.cz.

See [http://www.iupac.org/divisions/current\\_projects/2000/990241\\_400\\_00.html](http://www.iupac.org/divisions/current_projects/2000/990241_400_00.html) for project description and update.

1. A. G. MacDiarmid. *Synth. Met.* **84**, 27–34 (1997).
2. J. Stejskal, M. Špírková, A. Riede, M. Helmstedt, P. Mokreva, J. Prokeš. *Polymer* **40**, 2487–2492 (1999).

## Solubility Phenomena—Applications for Environmental Improvement

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IUPAC has approved a project for the detailed planning of a workshop, Solubility Phenomena—Applications for Environmental Improvement, to be held as part of the 10<sup>th</sup> International Symposium on Solubility Phenomena in Varna, Bulgaria in August 2002.

The following General Focus Statement has been agreed upon:

Solubility is a fundamental property of all substances and can greatly influence the composition of both naturally occurring and man-made chemical systems. In many of these systems, understanding the solubilities of the chemical components opens the door to alterations and manipulations of systems that may reduce the spread of pollutants, assist in the recycling of industrial wastes, and in other ways improve the quality of environments. This workshop will focus on the linkages between the fundamental chemistry of solubility and technology innovations that can lead to environmental improvements. Particular emphasis will be given to the solubility of industrial wastes and pollutants in aqueous systems.

The workshop's goal is to stimulate the production and communication of scientific information related to solubility in ways that are accessible and useful to environmental policy makers. In order to meet this goal, it is necessary to attract both leading scientists and government policy makers; therefore, the specific subject of the workshop is critical and should have the following three important characteristics:

- Solubility (broadly defined) should play an important role.
- There should be broad public concern on a regional and international level (perhaps with the

focus of Southeast Europe and/or the Eastern Mediterranean Basin-Black Sea area).

- Significant improvements should be possible at affordable cost if policy makers receive good scientific advice.

Planning for the workshop is directed toward the following five elements:

- identifying appropriate international bodies for collaboration, cosponsorship, and external funding;
- identifying specific environmental issues in and beyond the regional venue of the workshop (Southeastern Europe) to which improved knowledge of solubility can contribute;
- selecting workshop speakers and discussion leaders;
- devising means of outreach to environmental specialists; and
- securing external funding necessary for holding the workshop.

This project is being coordinated by Prof. David G. Shaw, Chairman of IUPAC's Commission on Solubility Data (V.8), with participation of other members of the Commission. Comments from the chemistry community are welcome and should be addressed to the project coordinator, Prof. David G. Shaw, Institute of Marine Science, University of Alaska, Fairbanks, Alaska 99775-7220, USA; Tel: +1 907 474 7723; Fax: +1 907 474 7204; E-mail: [ffdgs@uaf.edu](mailto:ffdgs@uaf.edu).

See [http://www.iupac.org/divisions/current\\_projects/2000/990381\\_500\\_00.html](http://www.iupac.org/divisions/current_projects/2000/990381_500_00.html) for project description and update.

## Structure and Properties of Cyclic Olefin Copolymers

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Modification of general purpose polyolefin materials to enhance their performance characteristics to the level of engineering plastics is currently a hot topic of industrial as well as academic research. Copolymerization of ethylene with cyclic olefin monomers produces high-Tg, optically clear, low-shrinkage, low-moisture-absorption, and low-birefringence materials. Such materials are currently being produced by Mitsui Petrochemical, Hoechst Celanese, Japan Synthetic Rubber, and Nippon Zeon Co., and they are being used as packaging materials, plastic lenses, and new substrates for compact discs and other optical storage media. Processing of cyclic olefin copolymers is rather difficult, and the relationship between their rheological properties and their chemical structure needs to be well established. Incorporation of polar monomers such as acrylates

during copolymerization is sometimes employed to improve the adhesion properties. Surface characteristics exhibited with the inclusion of polar monomers also need to be analyzed.

IUPAC has approved a project to evaluate structure–property relationships of recently commercialized cyclic olefin copolymers by means of structure analysis, rheological measurement, surface characterization, and property estimation. This project is being coordinated by Prof. Sung Chul Kim, a Titular Member of IUPAC's Commission on Polymer Characterization and Properties (IV.2), with participation of other members of the Commission. Comments from the chemistry and polymer community are welcome and should be addressed to the project coordinator, Prof. Sung Chul Kim, Department of Chemical Engineering, Korea Advanced Institute of Science and Technology, 373-1 Kusongdong, Yusongku, Taejon 305-701, Korea; Tel.: 82 42 869 3914; Fax: 82 42 869 3910; E-mail: kimsc@mail.kaist.ac.kr.

See [http://www.iupac.org/divisions/current\\_projects/2000/990391\\_400\\_00.html](http://www.iupac.org/divisions/current_projects/2000/990391_400_00.html) for project description and update.

### Terminology of Polymers with Ionizable Groups and Polymers Containing Ions

Properties of several polymeric materials are related to the presence of ionic groups being either inherent fragments of polymer molecules or present in low-molecular-weight components of composite polymeric materials. The presence of both ionic and covalent bonds makes ionic polymers a very diverse group of materials, and their physical properties can vary from soft, pliable thermoplastics (e.g., ionomers) via rubbery elastomers to rigid, cross-linked materials (e.g., ion-exchange resins). The importance of this group of polymers stems from their widespread application in many areas of everyday life and industrial production.

IUPAC has approved a project to formulate clear concepts and definitions of terms related to the structure and properties of polymeric materials containing ionic or ionizable groups. The aim of this project is to eliminate the ambiguity and lack of precision often found in scientific and technical literature discussing chemistry and properties of ionic polymers. This project is being coordinated by Prof. Przemysław Kubisa, a Titular Member of IUPAC's Commission on Macromolecular Nomenclature (IV.I), with participation of other members of the Commission. Comments from the chemistry and polymer community are welcome and should be addressed to the project coordinator, Prof. Przemysław

Kubisa, Center of Molecular and Macromolecular Studies, 112 Sienkiewicza St., 90-363 Łódź, Poland; Tel.: +48 42 681 96 08; Fax: +48 42 68471 26; E-mail: pkubisa@bilbo.cbmm.lodz.pl.

See [http://www.iupac.org/divisions/current\\_projects/2000/000061\\_400\\_00.html](http://www.iupac.org/divisions/current_projects/2000/000061_400_00.html) for project description and update.

### Glossary of Terms Relating to Polymeric Gels and Networks, Hybrid Inorganic Polymeric Materials, and the Processing Thereof

This is a joint project of the Inorganic (II) and Macromolecular (IV) Divisions within the remit of the Materials Initiative. The project team includes scientists from academia, industry, and publishing.

IUPAC has approved the project with the intention of establishing precise base definitions of terms that will carry meaning for all academic and industrial chemists involved with this rapidly expanding technology. The materials embraced by the project range from inorganic porous gels and denser materials through organic/inorganic molecular hybrids and composites to certain types of organic network polymers. The processing of the materials can be from the liquid state using sol-gel methodologies or swelling/drying techniques, or from the solid state using the methods of blending and mixing. The different terms relating to both materials and the methods of processing that are in current use can be confusing to practitioners according to whether their background is rooted in polymer, inorganic, or applied chemistry. General terms concerned with classes of starting materials, intermediates and final product materials, their microstructures, the characteristic properties that relate to their processing, etc., will all be included.

The preparation of definitions is being coordinated by Profs. Richard Jones and Alan Chadwick, Titular Members of IUPAC's Commissions on Macromolecular Nomenclature (IV.I) and High-Temperature Materials and Solid State Chemistry (II.3), respectively, with participation from other members of both Commissions. Comments from the chemistry and polymer community are welcome and should be addressed to the project coordinator, Prof. Prof. Richard Jones, School of Physical Sciences, University of Kent, Canterbury, Kent CT2 7NR, England, United Kingdom; Tel.: +44 1227 823544; Fax: +44 1227 827558; E-mail: r.g.jones@ukc.ac.uk.

See [http://www.iupac.org/divisions/current\\_projects/2000/000071\\_400\\_00.html](http://www.iupac.org/divisions/current_projects/2000/000071_400_00.html) for project description and update.

## News and Notices from Other Societies and Unions

### New [www.royalsoc.ac.uk](http://www.royalsoc.ac.uk) (The Royal Society)

This article originally appeared in the March 2000 issue of *The Royal Society News*, published by the Press and Public Relations Unit of the Royal Society (6 Carlton House Terrace, London SW1Y 5AG, England, UK), to whom we extend thanks for their permission to reproduce it in full.



On 26 January 2000, the Royal Society relaunched its web site ([www.royalsoc.ac.uk](http://www.royalsoc.ac.uk)), unveiling a new look with added features. This effort is part of the current drive to help the Society raise its profile and respond better to the needs of its increasingly diverse audiences.

Harnessing the help of the designers Synergy Communications, the aim of the redesign was to make the site more dynamic and user-friendly while taking advantage of developing web technologies and increased functionality.

The new site is now ordered with the end-user/audience in mind and offers full navigation between the various sections of the site via a navigation bar and link menus. Additional features of the new site include a dynamic home page with a changing “face of science” graphic, press release notices, and a daily update of science issues in the media; a registration system enabling users to receive e-mail updates of the Society’s activities; easy access to downloadable reports, media releases, and grant forms; and a secure, private area, solely for the use of Fellows—The Fellows’ Room. This area of the site is intended to provide information of specific interest to Fellows of the Royal Society and includes a Discussion Forum.

Future developments being planned include a searchable media directory of specialists, the transfer onto the site of some of the Society’s vast library and archive resources, and an education “subsite” aimed specifically at school children and teachers.

The web site will play an increasingly important part in the promotion of the Society and science in the future, and it is hoped that users will find the new site both informative and easy to use. We welcome any comments that you may have on the new look and structure of the web site. Please direct them to the Web Manager ([webmanager@royalsoc.ac.uk](mailto:webmanager@royalsoc.ac.uk)).

### Academies to Provide Science Advice to World Leaders

This article originally appeared in the March 2000 issue of *The Royal Society News*, published by the Press and Public Relations Unit of the Royal Society (6 Carlton House Terrace, London SW1Y 5AG, England, UK), to whom we extend thanks for their permission to reproduce it in full.

Eleven World Academies met in Davos, Switzerland in February 2000—a meeting convened to coincide with the World Economic Forum (WEF), which brings together top politicians, economists, business leaders, and opinion formers for an annual meeting to discuss global economic issues. The Academies discussed setting up a new organization to provide science advice to world leaders and to major intergovernmental agencies. The provisional title of the body is the InterAcademy Council (IAC). The Academies also took the opportunity to discuss with WEF participants key scientific issues likely to affect the world over the next decade, such as energy needs, information tech-



Presidents of science academies meet in Davos, Switzerland.



nology, ecosystems, disease, natural disasters, and science's contribution to rational decision making.

Those meeting agreed to pursue the idea of an InterAcademy Council, and four "wise men" were charged with preparing a draft constitution for the new Council. This document was discussed at the beginning of the "sustainability" meeting of national academies in Tokyo in May 2000.

The Tokyo conference's primary purpose was to

discuss global sustainability and to produce a statement agreed upon by over 50 academies on "transition to sustainability". It also provided an opportunity for the larger InterAcademy Panel (IAP) to discuss its own future. The Royal Society is expecting to continue to play a leading role in international science policy and remains actively involved in the discussions about the new Council and about the future direction of IAP.

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## Awards and Prizes

### Ronald Breslow Elected to Royal Society

Prof. Ronald Breslow, Chemistry and University Professor at Columbia University in New York City and Titular Member of IUPAC's Organic and Biomolecular Chemistry Division (III) Committee as well as Member of the Subcommittee on Bioorganic Chemistry, has been elected as one of six new foreign members to the United Kingdom's prestigious Royal Society. Since its founding in 1660, the Royal Society has served as an independent academy promoting the natural and applied sciences. No more than 42 new fellows and 6 foreign members are elected annually for their contributions to science, both in fundamental research and through directing scientific and technological progress in industry and research establishments.

Prof. Breslow has been a leader in the field of bioorganic chemistry for more than 35 years, starting with his landmark paper that explained the mechanism of thiamine pyrophosphate as a catalyst, thereby leading to the concept of stabilized carbenes. He formulated the term "biomimetic chemistry" and developed many significant examples of reactions that simulate enzyme catalysis, such as the creation of an artificial enzyme in which two functional groups act synergistically to perform phosphate ester hydrolysis with high product selectivity. Prof.



Breslow also pioneered cyclodextrin chemistry, using that molecule as a cage in which selective chemistry with metals, coenzyme analogs, and aromatic substitution could be studied. He has also won the National Medal of Science and the 1999 Priestley Medal of the American Chemical Society.

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## New Books and Publications

### New Books from IUPAC

***Macromolecular Symposia, Vol. 146: Molecular Order and Mobility in Polymer Systems. Symposium Editor, Yu. Ya. Gotlib; Editor-in-Chief, Hartwig Hocker; Editors, W. Guth, B. Jung, I. Meisel, and S. Spiegel. Published by WILEY-***

***VCH, November 1999, pp. 1-273. ISBN 3-527-29906-8 (ISSN 1022-1360).***

Volume 146 of *Macromolecular Symposia* contains the lectures presented at the 3<sup>rd</sup> International Symposium on Molecular Order and Mobility in Polymer Systems held 7-10 June 1999 in St. Petersburg, Russia (see symposium report by Prof. V. A. Kabanov published in *Chemistry International* in January

2000, Vol. 22, No. 1, pp. 17–18). That symposium continued the series of St. Petersburg meetings organized by the Institute of Macromolecular Compounds of the Russian Academy of Sciences (RAS), with the sponsorship of IUPAC and the support of the Russian Foundation of Basic Research and the St. Petersburg Research Center of RAS.

The 3<sup>rd</sup> Symposium (as well as the first one in 1994) was oriented more toward dynamic and relaxation phenomena, whereas the discussion at the 2<sup>nd</sup> Symposium (May 1996) focused mainly on problems of structure and order. Of course, these shifts in subject matter are never too dramatic; mobility in polymer physics and physical chemistry—just as in real life—is inseparable from the order (or disorder!) of the system.

The main topics of the 3<sup>rd</sup> Symposium included conformation and mobility of macromolecules in solutions, melts, and networks in strong external fields; structure and properties of liquid-crystalline polymers; block copolymers; polymer layers, brushes, and micelles; polymer complexes and membranes; and structure and dynamics of branched polymer systems, stars, dendrimers, and networks. All the systems considered share a common general feature: the order in them is “soft”, and there exists a pronounced molecular mobility.

The 3<sup>rd</sup> Symposium included 18 invited plenary lectures, 32 contributed lectures, and 180 poster presentations. This meeting was a truly international one; lectures and posters were submitted by scientists from Canada, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Israel, Japan, Kazakhstan, Lithuania, Netherlands, Portugal, Russia, Spain, Sweden, Turkey, United States, Uzbekistan, Ukraine, and the United Kingdom. A short account of the materials presented at the symposium was published in the book of abstracts. The plenary and contributed lectures were presented by eminent scientists at the pinnacle of their fields in polymer science (such as Sam Edwards, Tatiana Birstein, Victor Kabanov, etc.) and also by well-known active researchers of younger generations. The symposium featured a dynamic poster session that included presentations by many participants, especially young scientists, accompanied by very lively discussions.

Regrettably, this volume does not cover all the new and interesting results discussed at the symposium, because not all the authors were able to present their lectures for publication in it (some of the materials had been published earlier or submitted elsewhere). However, it provides a good representation of the scope of the meeting and of the main topics of the discussion.

Because of the close interconnection between the different topics, we preferred a less detailed classification of papers than that given in the original topics of the symposium. The classification accepted in this volume (“Mobility-Structure-Order” or “Structure-Order-Properties”) is still of a somewhat conditional character and is based on the most characteristic features of the investigation in a given paper.

### **Mobility-Structure-Order**

The lectures devoted to polymer dynamics describe various types of relaxation phenomena on different time and length scales (from nanoscale to macroscopic) investigated by a broad variety of experimental, theoretical, and computer simulation methods. Polarized luminescence provides information on the molecular mobility in the nanosecond range that can be used to characterize molecular structure for copolymers of various chemical structure (Anufrieva et al.). An extensive set of methods (DSC, interferometric spectroscopy, TGA, dielectric relaxation spectroscopy, and thermally stimulated depolarization) were applied to study molecular dynamics in nanostructured polyimidesilicon materials (Bershtein et al.). Dybal and coworkers investigated the structure and mobility in polycarbonates and polycarbonate-PEO mixtures by NMR and vibrational spectroscopy. The relaxation of poly(4-oligodimethylsiloxanyl) styrene as seen by solid state <sup>29</sup>Si NMR was discussed by Kawakami in connection with the gas permeation behavior of the polymer membranes. Quasi-elastic neutron scattering, X-ray spectroscopy, and dielectric spectroscopy were applied to the investigation of the superstructure, order, and segmental dynamics of carbosilane dendrimers in bulk and solution (Stuehn et al.). Mechanical strength, ion conductivity, gas permeability, and ion exchange capacity were studied for new polymer membranes used for low-temperature fuel cells (Sundholm et al.). Rheo-optical FT-IR spectroscopy was used for investigating the intra- and intermolecular hydrogen bonding and its effect on the local mobility in solid poly(acrylic acid) films (Mavinkurve and Heyvelmans-Wijdenes). The mechanical and electrical degradation processes of polymer composites and the application of the Zhurkov thermofluctuation theory were studied by Mamedov et al.

Some papers were devoted to the theory and computer simulation of molecular mobility. The theoretical approach to the viscoelasticity of the polymer melt and cross-linked system as a function of frequency and cross-linking was developed by Edwards and Takano in the framework of a tube

model. The topology of the system and closing of the tube at cross-links were taken into account. The influence of the long-range hydrodynamic interactions between the polymer network and the effective viscous medium on the cooperative relaxation spectra was considered by Gotlib. Borodin and Khazanovich proposed a nonstandard alternative approach to hydrodynamic interactions in polymer solutions applied to the calculation of the diffusion coefficient and intrinsic viscosity of polymer solutions. An application of the mode-coupling theory to the dynamics of the DNA macromolecules and proteins and its effects on the NMR relaxation was treated by La-Penna and coworkers. Fatkullin and Kimmich considered the problems of intra- and interchain relaxation in entangled polymer melts using memory function formalism and also treated the visco-elastic properties of polymer melts with the help of renormalized Rouse formalism. Ngai presented an improved theory of the concentration dependence of the cooperative polymer dynamics in solutions based on the general coupling model explaining the stretched exponential time dependence of correlation functions and the same type of stretched exponential dependence of relaxation times on concentration. The conformational change and the kinetics of the coil-stretch transition in polymer chains in a steady elongational flow were investigated by computer simulation (de la Torre and Cifre). Oleinik and coworkers performed a detailed computer modeling of the local structure and rotational mobility of ethylene-olefin copolymers in *n*-paraffin crystals.

Thus, the theoretical work and computer simulations emphasize a detailed study of the collective motions in complex many-chain systems and the effects of strong external or internal fields (as in crystalline phases).

### Structure-Order-Properties

The papers of this part of the symposium were devoted to the study of the interconnection between chemical constitution, morphology, and order for a broad class of macromolecular systems mentioned in the topics of the symposium. New types of mesophases (e.g., aperiodic layer mesophases) in rigid-chain copolymers and co-(poly)esteramides appearing in the two-phase semicrystalline materials were considered by Antipov, Plate, and Levchenko. Experimental electron microscopic structure investigations of organic molecules with nonlinear optical properties and *ab initio* quantum-mechanical structure determination were carried out by Voigt-Martin and coworkers. In the paper by Koyun et al., the effects of the molecular and super-

molecular structure of polyolefin on some mechanical properties of plastics used for manufacturing pipes were investigated. The structure of hydrophobically modified poly(ethylene oxide), association and ordering effects, formation of aggregates, and rheological behavior were considered by François et al. The interconnection between the polymer structure and optical properties (in IR and UV spectra) for polymer composite films was investigated by Boydag et al. Zaitsev and coworkers have studied the structure and properties of polymethylsiloxane monolayers with styrene and polystyrene-polysiloxane latexes and monolayer films. The group of papers was devoted to the properties of the neutral and charged hydrogels, their interaction with incorporated particles and surfactants (Starodoubtseva, Khokhlov et al.), the complexes between gels and organic dyes (Nasimova, Makhaeva, Khokhlov), and problems of the ion aggregation in hydrogels (Philippova, Khokhlov et al.).

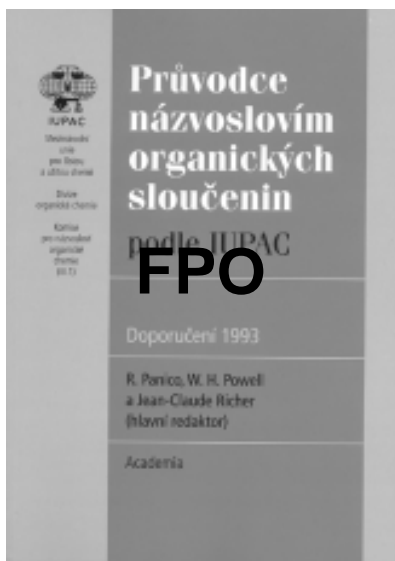
Theory and computer simulation of the structure-order problem was also represented extensively in the symposium. The theory of mixed superstructures with different morphology formed in mixtures of ABC-triblock and AB-, AC-, and BC-diblock polymers was presented by Birshtein, Amoskov, and Polotskii. Johner, Vilgis, and Joanny considered the behavior of polyelectrolyte gels in poor solvent chains on the basis of single-chain elasticity, using the necklace model of polyelectrolytes. Paul, Weber, and Binder considered the competition between local LC-ordering and glassy-freezing in melts of semiflexible polymers using the MC computer simulation of the bond-fluctuation model. A simulation of a specific structurally ordered phase intermediate between the crystalline and amorphous phases was performed by Ludovice et al. Conformational structure and some dynamic characteristics of charged polyelectrolyte brushes (anchored chains) were studied by the molecular dynamics method of Seidel and Csaika. Lukasheva, Darinskii et al. studied (by the molecular mechanics method) the conformation of polyisocyanates with helical structure, and investigated the mechanisms of helix reversal and the comparative role of breaks and librations in the chain flexibility of PIC. The microstructure and collapse transition of protein-like AB-copolymer globules was investigated by computer simulation by Ivanov et al.

This brief review of the lectures of the symposium presented in this volume shows that the main interest in the investigation of the "structure-order-properties" problem lies in the domain of systems with complex chemical constitution and morphology such as polyelectrolytes, copolymers,

mesophases, glassy states with local ordering, etc.

We believe that this symposium contributed significantly to the understanding of the interconnection of mobility and order in polymer systems.

**Prof. Yu. Ya. Gotlib**  
**Institute of Macromolecular Compounds**  
**St. Petersburg, Russia**



**Czech Edition of Blue Book: A Guide to IUPAC Nomenclature of Organic Compounds. Recommendations 1993. Originally prepared for publication by R. Panico, W. H. Powell, and Jean-Claude Richer (Senior Editor). Czech Edition: Průvodce názvoslovím organických sloučenin podle IUPAC. Doporučení 1993. Translation prepared by Jaroslav Kahovec, František Liška, and Oldřich Paleta. Softcover, 2000, pp. 1–220, ISBN 80-200-0724-5.**

*A Guide to IUPAC Nomenclature of Organic Compounds: Recommendations 1993* (the Blue Book), which was originally prepared for publication by R. Panico, W. H. Powell, and Jean-Claude Richer (Senior Editor), has been translated into Czech by Jaroslav Kahovec (a National Representative on IUPAC's Commission on Nomenclature of Organic Chemistry [III.1]), František Liška, and Oldřich Paleta.

The Czech edition, *Průvodce názvoslovím organických sloučenin podle IUPAC. Doporučení 1993* (ISBN 80-200-0724-5), has been published by Vydala Academia, nakladatelství Akademie věd České Republiky, Legerova 61, 120 00 Praha 2, Czech Republic.

## Technical Reports and IUPAC Recommendations Published in 1999 Issues of *Pure and Applied Chemistry (PAC)* and Elsewhere

The Technical Reports and IUPAC Recommendations (asterisk [\*] designates Recommendations) listed below have appeared in 1999 issues of *Pure and Applied Chemistry (PAC)* and elsewhere. They can be viewed on the IUPAC web site at <http://www.iupac.org/reports/1999/index.html>.

### Physical Chemistry

- Interfaces against pollution - (I.6), *Colloids and Surfaces A* **151**, Nos. 1 and 2 (1999).
- Evaluated kinetic and photochemical data for atmospheric chemistry. Supplement VII (Organics) - (I.4), *J. Phys. Chem. Ref. Data* **28**, 191–393 (1999).
- Electrochemical biosensors: Recommended definitions and classification - (I.7, V.5), *Pure Appl. Chem.* **71**(12), 2333–2348 (1999).
- Pillared clays and pillared layered solids - (I.6), *Pure Appl. Chem.* **71**(12), 2367–2371 (1999).

### Inorganic Chemistry

- Practitioner's report: International Measurement Evaluation Programme IMEP-7: Inorganic components in human serum - (II.4), *Accred. Qual. Assur.* **4**(11), 463–472 (1999).
- Definitions of terms for diffusion in the solid state\* - (II.3), *Pure Appl. Chem.* **71**(7), 1307–1325 (1999).
- Nomenclature of organometallic compounds of the transition elements\* - (II.2), *Pure Appl. Chem.* **71**(8), 1557–1585 (1999).
- Atomic weights of the elements 1997 - (II.1), *Pure Appl. Chem.* **71**(8), 1593–1607 (1999).
- Terminology for compounds in the Si-Al-O-N system\* - (II.3), *Pure Appl. Chem.* **71**(9), 1765–1769 (1999).

### Organic and Biomolecular Chemistry

- Bioorganic chemistry: A symposium in print - (III), *Bioorg. Chem.* **27**(1–2), (1999).
- Terminology, relative phototonic efficiencies, and quantum yields in heterogeneous photocatalysis. Part I: Suggested protocol - (III.3), *Pure Appl. Chem.* **71**(2), 303–320 (1999).
- Terminology, relative photonic efficiencies, and quantum yields in heterogeneous photocatalysis. Part II: Experimental determination of quantum yields - (III.3), *Pure Appl. Chem.* **71**(2), 321–335 (1999).
- Glossary of terms used in theoretical organic

- chemistry\* - (III.2), *Pure Appl. Chem.* **71**(10), 1919–1981 (1999).
- Extension and revision of the von Baeyer system for naming polycyclic compounds (including bicyclic compounds)\* - (III.1), *Pure Appl. Chem.* **71**(3), 513–529 (1999).
  - Extension and revision of the nomenclature for spiro compounds\* - (III.1), *Pure Appl. Chem.* **71**(3), 531–558 (1999).
  - Revised Section F: Natural products and related compounds\* - (III.1), *Pure Appl. Chem.* **71**(4), 587–643 (1999).
  - Critical compilation of scales of solvent parameters. Part I. Pure, non-hydrogen bond donor solvents - (III.2), *Pure Appl. Chem.* **71**(4), 645–718 (1999).
  - Corrections to *A Guide to IUPAC Nomenclature of Organic Compounds*\* - (III.1), *Pure Appl. Chem.* **71**(7), 1327–1330 (1999).

### Macromolecular Chemistry

- The use of diffusive sampling for monitoring of benzene, toluene, and xylene in ambient air - (IV.2), *Pure Appl. Chem.* **71**(10), 1993–2008 (1999).
- Studies on biodegradable poly(hexano-6-lactone) fibers: 2. Environmental degradation - (IV.2), *Pure Appl. Chem.* **71**(11), 2177–2188 (1999).
- The influence of reprocessing on the structure–property characteristics of a plasticized poly(vinyl chloride) (PVC-p) compound - (IV.2), *Pure Appl. Chem.* **71**(12), 2317–2332 (1999).

### Analytical Chemistry

- Harmonized guidelines for the use of recovery information in analytical measurement - (V), *Pure Appl. Chem.* **71**(2), 337–348 (1999).
- Phosphorus speciation in water and sediments - (V.2), *Pure Appl. Chem.* **71**(11), 2161–2176 (1999).
- Nomenclature, symbols, units, and their usage in spectrochemical analysis - XVII. Laser-based molecular spectrometry for chemical analysis: Absorption\* - (V.4), *Pure Appl. Chem.* **71**(11), 2189–2204 (1999).
- Analytical aspects of chemical process control: Part 1. Fundamentals - (V.1), *Pure Appl. Chem.* **71**(12), 2303–2308 (1999).
- Temperature dependence of the Westcott g-factor for neutron reactions in activation analysis - (V.7), *Pure Appl. Chem.* **71**(12), 2309–2315 (1999).
- Influence of pressure on chemical equilibria in aqueous systems - with particular reference to seawater - (V.6), *Pure Appl. Chem.* **71**(5), 871–890 (1999).

- Terminology and convention for electrochemical stripping analysis - (V.5), *Pure Appl. Chem.* **71**(5), 891–897 (1999).
- Species-selective analysis for metal-biomacromolecular complexes using hyphenated techniques - (V.2), *Pure Appl. Chem.* **71**(5), 899–918 (1999).
- Classification and use of terms for amplification and related reactions \* - (V.1), *Pure Appl. Chem.* **71**(7), 1331–1335 (1999).
- Classification of scanning probe microscopies - (V.2), *Pure Appl. Chem.* **71**(7), 1337–1357 (1999).
- A critical evaluation of the redox properties of uranium, neptunium and plutonium ions in acidic aqueous solutions - (V.5), *Pure Appl. Chem.* **71**(9), 771–1807 (1999).

### Chemistry and the Environment

- IUPAC collaborative trial study of a method to detect genetically modified soy beans and maize in dried powder - (VI.5), *J. AOAC Int.* **82**(4), 923–928 (1999).
- Determination of mono- and diacylglycerols in edible oils and fats by high performance liquid chromatography and evaporative light scattering detector: Results of collaborative studies and the standardized method - (VI.6), *Pure Appl. Chem.* **71**(10), 1983–1991 (1999).
- The determination of stigmastadienes in vegetable oils - (VI.6), *Pure Appl. Chem.* **71**(2), 349–359 (1999).
- The determination of cadmium in oils and fats by direct graphite furnace atomic absorption spectrometry - (VI.6), *Pure Appl. Chem.* **71**(2), 361–368 (1999).
- Reports on pesticides (41): Significance of the long range transport of pesticides in the atmosphere - (VI.4), *Pure Appl. Chem.* **71**(7), 1359–1383 (1999).

### Chemistry and Human Health

- Glossary of terms used in combinatorial chemistry - (VII.M), *Pure Appl. Chem.* **71**(12), 2349–2365 (1999).

### Other

- Guidelines for the use of the Internet by IUPAC bodies - (CPEP), *Pure Appl. Chem.* **71**(8), 1587–1591 (1999).
- An extension to the JCAMP-DX standard file format\* - (CPEP), *Pure Appl. Chem.* **71**(8), 1549–1556 (1999).

\*IUPAC Recommendations

*Evaluated Kinetic and Photochemical Data for Atmospheric Chemistry, Halogen Species: Supplement VIII. IUPAC Subcommittee on Gas Kinetic Data Evaluation for Atmospheric Chemistry*, by R. Atkinson, D. L. Baulch, R. A. Cox, R. F. Hampson Jr., J. A. Kerr (Chairman), M. J. Rossi, and J. Troe. USD 55.00. Published in the *Journal of Physical and Chemical Reference Data*, Vol. 29, No. 2, pp. 167–266, 2000, by the American Chemical Society (1155 Sixteenth Street, N.W., Washington, DC 20036-9976) and the American Institute of Physics (Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502) for the National Institute of Standards and Technology [S0047-2689(00)00302-0].

This paper updates and extends part of the previous database of critical evaluations of the kinetics and photochemistry of gas-phase chemical reactions of neutral species involved in atmospheric chemistry [*J. Phys. Chem. Ref. Data* 9, 295 (1980); 11, 327 (1982); 13, 1259 (1984); 18, 881 (1989); 21, 1125 (1992); 26, 521 (1997); 26, 1329 (1997); 28, 191 (1999)].

The present evaluation is limited to the inorganic halogen family of atmospherically important reactions. The work has been carried out by the authors under the auspices of the IUPAC Subcommittee on Gas Phase Kinetic Data Evaluation for Atmospheric Chemistry. Data sheets have been prepared for 102 thermal and photochemical reactions, containing summaries of the available experimental data with notes giving details of the experimental procedures.

For each thermal reaction, a preferred value of the rate coefficient at 298 K is given, together with a temperature dependence where possible. The selection of the preferred value is discussed, and estimates of the accuracies of the rate coefficients and temperature coefficients have been made for each reaction.

For each photochemical reaction, the data sheets list the preferred values of the photoabsorption cross sections and the quantum yields of the photochemical reactions, together with comments on how they were selected.

The data sheets are intended to provide the basic physical chemical data needed as input for calculations that model atmospheric chemistry. A table summarizing the preferred rate data is provided, together with an appendix listing the available values of enthalpies of formation of the reactant and product species.

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## Provisional Recommendations

### IUPAC Seeks Your Comments

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In this section, we publish synopses of IUPAC's latest provisional recommendations on nomenclature and symbols. All comments on these recommendations are welcome and will be taken into consideration. The final revised versions are published in *Pure and Applied Chemistry*.

If you would like to comment on the provisional recommendations, please visit the IUPAC web site at <http://www.iupac.org/reports/provisional/index.html>, where the full texts are available for downloading as draft pdf files. Alternatively, you can write to your nearest national/regional center to request a copy; the most recent list of national/regional centers is available on the web site at the address above and last appeared in *Chemistry International* 17, 141 (1997).

### Macromolecular Division. Commission on Macromolecular Nomenclature—Generic Source-Based Nomenclature for Polymers

<[http://www.iupac.org/reports/provisional/abstract00/marechal\\_280201.html](http://www.iupac.org/reports/provisional/abstract00/marechal_280201.html)>

The commission has already published two documents on the source-based names of linear copolymers and nonlinear polymers; however, in some cases this nomenclature leads to ambiguous names. The present document proposes a generic source-based nomenclature that solves these problems and yields clearer source-based names. A generic source-based name comprises two parts:

1. a polymer class (generic) name followed by a colon; and
2. the actual or hypothetical monomer name(s), parenthesized in the case of a copolymer.

The formula, the structure-based name, the

source-based name, and the generic source-based name are given for each example in the document. In some cases, only generic source-based nomenclature gives unambiguous names—for example, when a polymer has more than one name or when it is obtained through a series of intermediate structures. The rules concern mostly polymers with one or more types of functional group or heterocyclic system in the main chain, but to some extent they are also applicable to polymers with side-groups, carbon-chain polymers such as vinyl or diene polymers, spiro and cyclic polymers, and networks.

Comments by 28 February 2001 to Prof. Ernest Maréchal, Laboratoire de Synthèse Macromoléculaire, Université Pierre et Marie Curie (Paris VI), Boîte 184 – Tour 54, 4e étage, 4 place Jussieu, F-75252 Paris Cédex 05, France; Tel.: +33 1 44 27 38 04; Fax: +33 1 44 27 70 54; E-mail: marechal@ccr.jussieu.fr.

**Analytical Chemistry Division. Commission on Separation Methods in Analytical Chemistry—The Hold-Up Volume Concept in Column Chromatography**

<[http://www.iupac.org/reports/provisional/abstract00/jagd\\_280201.html](http://www.iupac.org/reports/provisional/abstract00/jagd_280201.html)>

Revised recommendations are presented for the nomenclature of the *hold-up volume* in chromatography, updating those originally presented in the IUPAC document “Nomenclature for Chromatography (IUPAC Recommendations 1993)”, *Pure and Applied Chemistry* **65**, 819–872 (1993). A number of related and derived definitions for retention parameters are described, including a definition of the term “chromatographic system”. The paper also

compares methods used in the literature to determine the hold-up volume.

Comments by 28 February 2001 to Prof. José Antonio García Domínguez, Institute of Physical Chemistry “Rocasolano”, Calle Serrano 119, E-28006 Madrid, Spain; Tel.: +34 91 561 9400; Fax: +34 91 564 2431; E-mail: jagd@iqfr.csic.es.

**Analytical Chemistry Division. Commission on Separation Methods in Analytical Chemistry—Retention Parameters in Gas Chromatography**

<[http://www.iupac.org/reports/provisional/abstract00/davenkov\\_280201.html](http://www.iupac.org/reports/provisional/abstract00/davenkov_280201.html)>

This paper presents a revision of terms in Chapter 3.6 The Mobile Phase and Chapter 3.7 Retention Parameters in Column Chromatography of the Nomenclature for Chromatography [“Nomenclature for Chromatography (IUPAC Recommendations 1993)”, *Pure and Applied Chemistry* **65**, 819–872 (1993)], with the aims of (i) emphasizing the physical meaning of the terms and (ii) specifying the temperatures and pressures for the terms for gas volumes and flow rates. A number of the original terms were found to be misleading or superfluous, including such terms as *corrected retention time*, *net retention time*, *total retention volume (time)*, *specific retention volume at 0 °C*, *relative pressure*; and their usage is strongly discouraged. Chapter 1.1 Basic Definitions was supplemented with the terms *chromatographic system* and *chromatographic process*.

Comments by 28 February 2001 to Prof. Vadim A. Davankov, Institute of Organo-Element Compounds, Russian Academy of Sciences, Vavilov Street 28, RU-117813 Moscow, Russia; Tel./Fax: +7 095 135 6471; E-mail: davank@ineos.ac.ru.

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## Reports from Commissions and Division Committees

### Commission on Food—VI.5

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**Summary of Minutes of Commission Meeting at IUPAC General Assembly, Berlin, Germany, 8–10 August 1999**

Members Present: Chair, J. Gilbert; Secretary, S. Page; M. Miraglia; Titular Members: E. Anklam, J. MacNeil, M. Sabino; Associate Members: C. Brera, S. Dragacci, B. Szteke

Observers Present: J.-M. Fremy, P. Holland (Secretary, Chemistry and the Environment Division), M. Lauwaars (AOAC International), A. Pohland

(Chemistry and the Environment Division), R. Wood (Analytical Chemistry Division)

The meeting started in plenary session and then split into two parallel sessions covering Food Chemistry and Oils and Fats. This report covers the projects discussed within the Food Chemistry section.

#### Working Group Activities

- *Mycotoxins*: IUPAC Electronic Bulletin Board for Mycotoxins. Ongoing project, but with need to update regularly identified as a priority. Collaborative studies of the Determination of Aflatoxin

M<sub>1</sub> in Milk and Mycotoxin Methods for Developing Countries have been combined with an FAO/IAEA project. "Identification of major sources of ochratoxin A (OA) intake through the analysis of OA in human serum" has been published as a preliminary report (D. Palli et al. *Cancer Epidemiology, Biomarkers, and Prevention* **8**, 265–269, 1999).

- *Aquatic Biotoxins*: Unification of Aquatic Biotoxin Nomenclature. Project to be terminated, but a satellite meeting on this subject was proposed in conjunction with the 10<sup>th</sup> International Symposium on Mycotoxins and Phycotoxins (10<sup>th</sup> ISMP).
- *Halogenated Hydrocarbons and Environmental Contaminants*: A collaborative study on novel and conventional analytical techniques for the determination of toxicologically relevant PCB congeners in fish and human adipose tissues has been completed. A workshop to discuss novel extraction techniques, particularly for fish oils, was being planned for Barcelona, Spain, in the spring of 2000.
- *Elements*: Beryllium in Food. A critical assessment has been completed and published in *Food Additives and Contaminants* **17**, 149–159 (2000).
- *Natural Constituents*: Chemical Characterization of Garlic Preparations. Project to be terminated.
- *Animal Drugs*: Symposium on Issues in Regulatory Chemistry was held at the annual meeting of AOAC International in August 1997. The proceedings of this symposium, entitled "Current Issues in Regulatory Chemistry" and edited by Kay, MacNeil, and O'Rangers, have been published by AOAC International (Gaithersburg, Maryland, USA, 2000), ISBN 0-935584-66-8. This project is now complete.
- *Novel Foods*: A proposed symposium on genetically modified organisms was withdrawn. Validation of a screening method for the detection of genetically modified organisms (GMOs) in food has been completed and published in *J. AOAC Int.* **82**, 923–928 (1999).

#### Symposia/Workshops

- 10<sup>th</sup> International IUPAC Symposium on Mycotoxins and Phycotoxins (10<sup>th</sup> ISMP) was held in Guarujá, Brazil, 21–25 May 2000 (see report on page 140).
- Symposium on Trace Elements in Foods is being planned for Warsaw, Poland, 9–11 October 2000, with IUPAC sponsorship (see Conference Calendar on page 157).
- 2<sup>nd</sup> International Symposium on Food Packaging—Ensuring the Safety and Quality of Foods

is being organized by ILSI Europe with IUPAC sponsorship and will be held in Vienna, Austria, 8–10 November 2000 (see Conference Calendar on page 157).

#### Future Organization and Direction

- Task forces were proposed to be developed to manage clusters of projects to be continued after the Commission structure is abolished in 2002. The Food Chemistry Working Group accepted this proposal. A Natural Toxins Task Force (E. Anklam, Head) and a Chemical Contaminants and Residues Task Force (J. MacNeil, Head) were recommended.
- Following an informal meeting with the Commission on Toxicology (VII.C.2) of the Chemistry and Human Health Division, the Food Chemistry Working Group decided to participate in the CHHD ELEPHANT database project. This project (E. Anklam, Coordinator) is a compilation of baseline data for certain analytes in human tissues and fluids. This effort would be expanded to include analytes (such as contaminants) derived specifically from food sources.
- A. Pohland and S. Page suggested that a CHEMRAWN Conference on "Chemistry for Food Safety" be proposed to the CHEMRAWN Committee. A preproposal was presented informally to this Committee by S. Page. This preproposal was well received. In collaboration with IOCD, a formal proposal (S. Page, Coordinator) will be prepared.

#### Next Meeting

The next meeting of the Commission on Food (VI.5) will be in Warsaw, Poland, 7–8 October 2000, just before the Symposium on Trace Elements in Food.

#### John Gilbert

Chairman, IUPAC Commission on Food VI.5



## Conference Announcements



designates IUPAC sponsorship.

### International Symposium on Green Chemistry, 10–13 January 2001, Delhi, India



This symposium will address new products, processes, and services that attempt to achieve benefits from sustainable development. Such efforts require new approaches that reduce the material and energy intensity of chemical processes and products, minimize or eliminate dispersion of harmful chemicals in the environment, maximize use of renewable resources, and extend durability and recyclability of products in a way that increases industrial competitiveness.

Some of the challenges for chemists include discovering and developing new synthetic pathways using alternative feedstocks or more selective chemistry, identifying alternative reaction conditions and solvents for improved selectivity and energy minimization, and designing less toxic and inherently safer chemical products. The organizers of the symposium hope to foster the establishment of industry–government partnerships with universities and international laboratories to design and implement pollution prevention technologies other than waste management.

Scientific sessions will cover metal complexes for green earth chemistry, biocatalysis and its use in chemical synthesis, ecofriendly chemical technologies, greenhouse gases and their elimination, freshwater ecosystems, green catalysts and reagents for industrial applications, energy and environment, and air pollutants and their elimination. Approximately 500 scientific participants from around the world are expected to attend this symposium.

For further information, contact Dr. M. Kidwai, Department of Chemistry, University of Delhi, Delhi 110007, India; E-mail: mkidwai@mantraonline.com; Tel.: +91 11 725 6235; Fax: +91 11 725 6250.

### 4<sup>th</sup> Annual UNESCO School and South African IUPAC Conference on Macromolecules and Materials Science, 9–11 April 2001, Johannesburg, South Africa



The School and Conference have the following goals:

- to expose Africa to macromolecules and materials technology that is applicable to their economies,

- to create a virtual teaching encyclopedia CD-ROM for teaching in developing countries, where books, journals, and teaching material preparation are not available,
- to teach analytical skills during the preceding week at the UNESCO School Preconference Workshop, and
- to provide a worldwide forum for the gathering of many top-notch materials scientists.

Scientific sessions will cover the following topics principally from an industrial perspective:

- monomer synthesis and transformations
- catalysts and polymer synthesis (including combinatorial chemistry)
- polymer properties (chemical characterization, hyphenated HPLC techniques, morphology, and ultrasonics)
- stabilization and degradation
- polymerization (especially metallocenes and living-free radical)
- polymer processing, especially for polymer intermediates
- polyolefins and emulsions
- macromolecular and materials education
- advanced materials, nanostructured systems

A preconference workshop will be held 7–8 April 2001 in Johannesburg. Approximately 150 scientific participants from around the world are expected to attend these events.

For further information, contact Prof. R. D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials, Institute for Polymer Science, University of Stellenbosch, Private Bag XI, Matieland 7602, South Africa; E-mail: rds@maties.sun.ac.za; Tel.: +27 21 808 3172; Fax: +27 21 808 4967.

### 2<sup>nd</sup> International Workshop on Thermochemical, Thermodynamic, and Transport Properties of Halogenated Hydrocarbons and Mixtures, 9–11 April 2001, Paris, France

This workshop, organized under the auspices of IUPAC's Commission on Thermodynamics (I.2), is intended to increase knowledge and understanding of equilibrium and transport properties of halogenated hydrocarbons and related compounds, and

their mixtures with hydrocarbons and other compounds. The workshop will have four main themes, including:

- environmental constraints and regulation
- new products (in refrigeration, medicine, insulation, etc.)
- new measurements (physical property characterization)
- fundamentals (intermolecular potential calculations with O, F, and Cl as main heteroatoms of interest) and molecular simulations

The workshop, which will take place at *École des Mines de Paris*, will consist of plenary lectures, oral and poster presentations, and a poster discussion session, with publication of the Proceedings in *Fluid Phase Equilibria*. In addition, there will be a panel discussion to review progress and to recommend topics for theoretical and experimental studies for presentation at the final workshop to be held in 2002.

See [http://www.iupac.org/divisions/current\\_projects/1998/121\\_18\\_98.html](http://www.iupac.org/divisions/current_projects/1998/121_18_98.html) for further details about this workshop project.

For more information, contact Dr. Dominique Richon, CEREP-École des Mines de Paris, 35 rue Saint-Honoré, F-770305 Fontainebleau, France, E-mail: [iupac\\_paris.wshop@cenerg.ensmp.fr](mailto:iupac_paris.wshop@cenerg.ensmp.fr); Tel.: +33 1 64 69 49 65; Fax: +33 1 64 69 49 68; Web site: [http://www-cenerg.ensmp.fr/iupac\\_paris.wshop/workshop.html](http://www-cenerg.ensmp.fr/iupac_paris.wshop/workshop.html).

### 3<sup>rd</sup> International Symposium on Free-Radical Polymerization: Kinetics and Mechanisms, 3–8 June 2001, Il Ciocco, Lucca, Tuscany (Castelvecchio Pascoli), Italy



This symposium aims at providing full coverage of the actual status of academic and industrial research into free-radical polymerizations. Subsections are planned on emulsion polymerization, controlled free-radical polymerization, polymerization in supercritical fluids, polymerization reaction engineering, and polymer characterization. Around 200 scientific participants from all over the world are expected to attend.

For additional information, contact Prof. Dr. M. Buback, Institute for Physical Chemistry, University of Göttingen, Tammannstrasse 6, 37077 Göttingen, Germany; E-mail: [mbuback@gwdg.de](mailto:mbuback@gwdg.de); Tel.: +49 551 393141; Fax: +49 551 393144.

### 15<sup>th</sup> Bratislava International Conference on Polymers: Preparation of Nonconventional Polymer Dispersions, 25–28 June 2001, Smolenice, Slovak Republic



This microsposium is aimed at the study of the kinetics of free-radical polymerization of conventional and nonconventional monomers in micelles, monomer/polymer particles, and emulsified simple or multiple droplets. The theme has an impact on the preparation of tailored nanosized polymer and copolymer particles of various degrees of hydrophilicity/lipophilicity and on the preparation of polymer dispersions and polymer products with special properties. This meeting should stimulate further basic and applied research on the kinetics of free-radical polymerization. Approximately 70 scientific participants from around the world are expected to attend this microsposium.

For more information, contact Prof. Ignac Capek, Polymer Institute, Slovak Academy of Sciences, 842 36 Bratislava, Slovak Republic; E-mail: [upolign@savba.sk](mailto:upolign@savba.sk); Tel.: +421 7 5477 2469; Fax: +421 7 5477 5923.

### 15<sup>th</sup> International Symposium on Plasma Chemistry (ISPC-15), 9–13 July 2001, Orléans, France



Plasmas are more and more deeply involved in many areas of science. The science and technology of these developments are closely connected. The extension of technologies from high-temperature arcs and torches to high- and low-pressure plasmas that are far from thermodynamic equilibrium now involves both chemical and physical engineering approaches.

Every two years, this symposium highlights progress in all areas of plasma chemistry. ISPC-15 will especially emphasize the growing importance of atmospheric pressure low-temperature plasmas and environmentally safe technologies, from the perspectives of basic science and applications. About 600 scientific participants from around the world are expected to attend ISPC-15.

For additional information, contact Dr. Jean-Michel Pouvesle, Laboratoire GREMI, Université d'Orléans, BP 6744, Orléans Cedex 2, France; E-mail: [jean-michel.pouvesle@univ-orleans.fr](mailto:jean-michel.pouvesle@univ-orleans.fr); Tel.: +33 (0) 2 38 41 71 24; Fax: +33 (0) 2 38 41 71 54.

4<sup>th</sup> International Symposium on  
Ionic Polymerization,  
22–26 October 2001, Crete, Greece



Ionic polymerization (anionic and cationic) leads to polymeric materials with well-defined structure, microstructure, molecular weight, composition, and functionality. Recently developed polymerization techniques (such as living radical, template, and enzymatic) are compatible with a wide variety of monomers and less demanding than ionic polymerization. The combination of ionic polymerization with such new techniques can lead to materials with special properties.

This symposium will focus mainly on new developments in ionic polymerization, although several sessions will be dedicated to other polymerization techniques. Because in polymer science it is extremely important to control properties by means of macromolecular architecture, one session will be devoted to the physics of polymers resulting from the procedures mentioned above. Approximately 250 scientific participants from around the world are expected to attend this symposium.

*For further information, contact Prof. Nikos Hadjichristidis, Department of Chemistry, University of Athens, Panepistimiopolis, Zografou, 157 71 Athens, Greece; E-mail: hadjichristidis@chem.uoa.gr; Tel.: +30 1 724 9103; Fax: +30 1 722 1800.*

7<sup>th</sup> International Symposium on  
Hyphenated Techniques in  
Chromatography and Hyphenated  
Chromatographic Analyzers (HTC-7),  
6–8 February 2002, Bruges, Belgium



This symposium aims to give an overview of the fundamental aspects, instrumental developments, and applications of the various hyphenated chromatographic techniques (e.g., coupling of GC or LC to LC, GC, and SFE-SFC; MS, FTIR, AED, and other techniques coupled with GC, (HP)LC, SFC, CZE, and FFF; PTV-GC-MS; on-line air traps-, purge-and-trap, extractors-, and GPC-GC (or LC); LC to NMR, Raman, FIA-DAD, light-scattering; ITP-MS; and SPME- and MESI-techniques). Emphasis will be placed on sample preparation, sample introduction, miniaturization, microfabricated analytical devices; and the design of hyphenated, on-line, and at-line chromatographic analyzers.

Hyphenated chromatography is generally used in medicine and pharmacy, food and feed analysis, and in environmental and forensic studies. The recent outbreak of food poisoning by dioxins and PCBs

could only be solved using GC-MS techniques. This HTC symposium is the sole Congress in the world devoted to hyphenated chromatography. Around 400 scientific participants from all over the world are expected to attend.

*For additional information, contact Robert Smits, Roelsstraat 20, B-8670 Oostduinkerke, Belgium; E-mail: smitsr@pophost.eunet.be; Tel./Fax: +32 58 514575.*

5<sup>th</sup> Annual UNESCO School  
and South African IUPAC Conference on  
Macromolecules and Materials Science,  
6–10 February 2002,  
Stellenbosch, South Africa



The School and Conference have the following goals:

- to expose Africa to macromolecules and materials technology that is applicable to their economies,
- to create a virtual teaching encyclopedia CD-ROM for teaching in developing countries, where books, journals, and teaching material preparation are not available,
- to teach analytical skills during the preceding week at the UNESCO School Preconference Workshop, and
- to provide a worldwide forum for the gathering of many top-notch materials scientists.

Scientific sessions will cover an academic approach to developments in:

- monomer synthesis and transformations
- catalysts and polymer synthesis (including combinatorial chemistry)
- polymer properties (chemical characterization, hyphenated HPLC techniques, morphology, and ultrasonics)
- stabilization and degradation
- polymerization (especially metallocenes and living-free radical)
- polymer processing, especially for polymer intermediates
- polyolefins and emulsions
- macromolecular and materials education
- advanced materials, nanostructured systems

The School will include five parallel sessions on:

- thermal analytical techniques
- stabilization and recycling
- chromatographic techniques
- light microscopy of polymers
- nano analytical techniques, including SPM, TPM,

TMPM, NSOM, SEM, TEM, LALS, etc.

A preconference workshop will be held 30 January–3 February 2002 in Stellenbosch. Approximately 300 scientific participants from around the world are expected to attend these events.

For further information, contact Prof. R. D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials, Institute for Polymer Science, University of Stellenbosch, Private Bag XI, Matieland 7602, South Africa; E-mail: rds@maties.sun.ac.za; Tel.: +27 21 808 3172; Fax: +27 21 808 4967.

**IUPAC World Polymer Congress  
2002—39<sup>th</sup> International Symposium on  
Macromolecules, 7–12 July 2002,  
Beijing, China**

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The World Polymer Congress is the largest worldwide congress that covers all major fields of polymer science and technology. This Congress will provide an important opportunity for polymer scientists to present and exchange their new research results on chemistry, physics, and technology of polymers and application of macromolecular sciences to materials science. Especially at the beginning of the new century, this Congress will also emphasize subjects of universal concern, such as the future and challenge of polymer science, its mutual penetration with other science and technology areas, polymers and the environment, and the latest concepts and developments. About 1 000 scientific participants from around the world are expected to attend World Polymer Congress 2002.

For more information, contact Prof. Fosong Wang, Chinese Academy of Sciences, Beijing 100864, China; E-mail: fswang@mimi.cnc.ac.cn; Tel.: +86 10 62563060; Fax: +86 10 62573911.

**14<sup>th</sup> International Conference on  
Organic Synthesis (ICOS-14),  
14–19 July 2002,  
Christchurch, New Zealand**

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This biennial IUPAC-sponsored conference is one of the premier meetings on synthetic organic chemistry and is well attended by organic chemists from around the world. It has a reputation for attracting high-profile synthetic organic chemists as speakers. Because the conference has never been held in Australasia before, it is anticipated that the New Zealand site will enable more participants from the Southern Hemisphere to attend.

The conference organizers have made a commitment to hold symposia on some of the newer aspects of organic synthesis, such as combinatorial chemistry and green chemistry. Subsections are planned on robots in organic synthesis, combinatorial chemistry, green organic synthesis, new synthetic methods, stereoselective synthesis, metal-mediated synthesis, total synthesis of bioactive compounds, and synthesis of supramolecular systems. Approximately 500 scientific participants from around the world are expected to attend ICOS-14.

For further information, contact Prof. Margaret A. Brimble, Department of Chemistry, University of Auckland, 23 Symonds St., Auckland, New Zealand; E-mail: m.brimble@auckland.ac.nz; Tel.: +64 9 373 7599, Ext. 8259; Fax: +64 9 373 7422.

**17<sup>th</sup> IUPAC Conference on  
Chemical Thermodynamics,  
28 July–2 August 2002,  
Rostock, Germany**

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This meeting will bring together scientists who participate in thermodynamic research in order to discuss the most recent advances and to stimulate new lines of research. Traditional areas, such as thermodynamics of mixtures and solutions, phase equilibria, and thermochemistry, are still of worldwide importance. Decreasing research activity in these areas in the highly developed countries is partly compensated by the activity of an increasing number of researchers from underdeveloped countries and from East European countries. Therefore, these more traditional areas will play a major role in the list of topics covered by this conference.

On the other hand, chemical thermodynamics can make useful and necessary contributions to innovative and rapidly developing fields whose importance will increase dramatically within the next years and decades. The conference will address the thermodynamic aspects of the rapidly developing fields of biothermodynamics and biotechnology, new materials, membrane separation techniques and transport across membranes, and ionic liquids as a new class of solvent systems. Approximately 500 scientific participants from around the world are expected to attend this conference.

For additional information, contact Prof. Andreas Heintz, Universität Rostock, FB Chemie, 180512 Rostock, Germany; E-mail: andreas.heintz@chemie.uni-rostock.de; Tel.: +49 381 498 1852; Fax: +49 381 498 1854.



The theme of this Congress, “Innovative Solutions  
for Healthy Crops”, represents an open platform for  
presentation and discussion of state-of-the-art ap-  
proaches in chemical synthesis, analytical sciences,  
discovery and selection tools, molecular biology, and

## Conference Calendar

Visit <http://www.iupac.org> for complete information and further links.

**NEW** designates a new conference since the last issue.

2000

### Biotechnology

3–8 September 2000

11<sup>th</sup> International Biotechnol-  
ogy Symposium, Berlin,  
Germany.

Prof. G. Kreysa, DEHEMA  
e.V.— c/o 11<sup>th</sup> IBS, Theodor-  
Heuss-Allee 25, 60486 Frank-  
furt/Main, Germany.

Tel.: +49 69 7564 235 / -249

Fax: +49 69 7564 176 / -304

E-mail:

[biotechnology2000@dechema.de](mailto:biotechnology2000@dechema.de)

### Nuclear and Radiochemistry

3–8 September 2000

5<sup>th</sup> International Conference on  
Nuclear and Radiochemistry  
(NRC5), Pontresina, Switzer-  
land.

Prof. H. W. Gäggeler, Chairman,  
Mrs. R. Lorenzen, Secretary,  
Paul Scherrer Institut, CH-5232  
Villigen-Ost, Switzerland.

Tel.: +41 56 310 2401

Fax: +41 56 310 4435

E-mail: [ruth.lorenzen@psi.ch](mailto:ruth.lorenzen@psi.ch)

### Analytical Chemistry

3–9 September 2000

EUROANALYSIS XI, Lisboa,  
Portugal.

Prof. Maria Filomena Camões,  
Chair, Dr. Cristina Oliveira,  
Secretary, Departamento de  
Química e Bioquímica,

Faculdade de Ciências,  
Universidade de Lisboa,  
Edifício C1-5<sup>o</sup> Piso,  
P-1700 Lisboa, Portugal.

Tel.: +351 1 3906138

Fax: +351 1 3909352; 7500088

E-mail: [euroanalysisxi@fc.ul.pt](mailto:euroanalysisxi@fc.ul.pt)

### Natural Products

4–8 September 2000

22<sup>nd</sup> International Symposium  
on the Chemistry of Natural  
Products, São Carlos, São Paulo,  
Brazil.

Dr. M. Fátima das G.F. da Silva,  
Universidade Federal de São  
Carlos, Depto. de Química, Via  
Washington Luiz, km 235,  
CP676, São Carlos, São Paulo,  
Brazil.

Tel.: +55 16 260 8208

Fax: +55 16 260 8350

E-mail: [dmfs@power.ufscar.br](mailto:dmfs@power.ufscar.br)

### Medicinal Chemistry

18–22 September 2000

XVI International Symposium  
on Medicinal Chemistry,  
Bologna, Italy.

Prof. C. Melchiorre, Università  
di Bologna, Dipartimento di  
Scienze Farmaceutiche, Via  
Belmeloro 6, I-40126 Bologna,  
Italy.

Tel.: +39 051 259 706

Fax: +39 051 259 734

E-mail: [camelch@alma.unibo.it](mailto:camelch@alma.unibo.it)

### Trace Elements in Food

9–11 October 2000

Warsaw, Poland.

Prof. B. Sztęke, Chairman, Dr. R.  
Jedrzejczak, Secretary,  
Institute of Agricultural and  
Food Biotechnology  
ul. Rakowiecka 36

02-532 Warsaw, Poland.

Tel.: +48 22 606 3876

Fax: +48 22 4904 28

E-mail:

[jedrzejczak@ibprs.waw.pl](mailto:jedrzejczak@ibprs.waw.pl)

### Food Packaging

8–10 November 2000

2<sup>nd</sup> International Symposium on  
Food Packaging—Ensuring the  
Safety and Quality Food,  
Vienna, Austria.

Liên-Anh Tran, ILSI Europe, 83,  
Avenue E. Mounier, Box 6,  
B-1200, Brussels, Belgium.

Tel.: +32 (2) 771 0014

Fax: +32 (2) 762 0044

E-mail: [anh@ilsieurope.be](mailto:anh@ilsieurope.be)

### Polymers

20–24 November 2000

7<sup>th</sup> Latin-American Symposium  
on Polymers (SLAP'2000) and  
5<sup>th</sup> Ibero American Congress on  
Polymers, Havana, Cuba.

Dr. Ricardo Martínez, Dr. Waldo  
Argüelles-Monal, IMRE,  
Universidad de La Habana  
La Habana 10400, Cuba.

Fax: +53 7 33 42 47

E-mail: [slap@imre.oc.uh.cu](mailto:slap@imre.oc.uh.cu)

**Polymer Characterization**

9–12 January 2001  
9<sup>th</sup> International Conference on Polymer Characterization (POLYCHAR), Denton, Texas, USA.

*Dr. Witold Brostow, Department of Materials Science, University of North Texas, Denton, Texas, 76203-5310 USA.*

*Tel.: +1 940 565 4358, -3262, or 4337*

*Fax: +1 940 565 4824*

*E-mail: brostow@unt.edu or polychar@marta.phys.unt.edu*

**Green Chemistry****NEW**

10–13 January 2001  
International Symposium on Green Chemistry, Delhi, India.

*Dr. M. Kidwai, Organizing Convenor, Department of Chemistry, University of Delhi Delhi 110007, India*

*Tel.: +91 11 725 6235*

*Fax: +91 11 725 6250*

*E-mail: mkidwai@mantraonline.com*

**Macromolecules****NEW**

9–11 April 2001  
4<sup>th</sup> Annual UNESCO School and South African IUPAC Conference on Macromolecules and Materials Science, Johannesburg, South Africa.

*Prof. R. D. Sanderson, UNESCO Associated Centre for Macromolecules and Materials, Institute for Polymer Science, University of Stellenbosch, Private Bag XI, Matieland 7602, South Africa*

*Tel.: +27 21 808 3172*

*Fax: +27 21 808 4967*

*E-mail: rds@maties.sun.ac.za*

**Chemistry and Chemical Engineering**

16–20 April 2001  
IV International Congress on Chemistry and XIII Caribbean Conference on Chemistry and

Chemical Engineering, Havana, Cuba.

*Prof. Alberto J. Núñez Sellés, Sociedad Cubana de Química, Ave 21&200, Atabey, Apdo. 16042, CP 11600, Havana, Cuba.*

*Tel.: +537 218 178*

*Fax: +537 336 471*

*E-mail: cqf@infomed.sld.cu*

**Free-Radical Polymerization**

3–8 June 2001 **NEW**  
3<sup>rd</sup> International Symposium on Free-radical Polymerization: Kinetics and Mechanism, Lucca, Italy.

*Prof. M. Buback, Institute for Physical Chemistry, University of Göttingen, Tammannstr. 6, D-37077 Göttingen, Germany*

*Tel.: +49 551 393141*

*Fax: +49 551 393144*

*E-mail: mbuback@gwdg.de*

**CHEMRAWN XIV**

9–13 June 2001  
Chemrawn Conference—Toward Environmentally Benign Processes and Products, Boulder, Colorado, USA.

*Dr. Dennis L. Hjeresen, Environmental Management Program, Los Alamos National Laboratory - Mail Stop J591, Los Alamos, NM 87545.*

*Tel.: +1 505 665 7251*

*Fax: +1 505 665 8118*

*E-mail: dennish@lanl.gov*

**Polymer Dispersions****NEW**

25–28 June 2001  
15<sup>th</sup> International Conference on Polymers: Preparation of Non-Conventional Polymer Dispersions, Smolenice, Slovak Republic.

*Prof. Ignac Capek, Polymer Institute, Slovak Academy of Sciences, SR-842-36 Bratislava, Slovak Republic*

*Tel.: +421 7 5477 2469*

*Fax: +421 7 5477 5923*

*E-mail: upolign@savba.sk*

**IUPAC 41<sup>st</sup> General Assembly**

29 June–8 July 2001  
Brisbane, Australia.  
*IUPAC Secretariat.*  
*Tel.: +1 919 485 8700*  
*Fax: +1 919 485 8706*  
*E-mail: secretariat@iupac.org*

**IUPAC 38<sup>th</sup> Congress/World Chemistry Congress 2001**

1–6 July 2001  
Brisbane, Australia.  
*Congress Secretariat, P.O. Box 177, Red Hill Q 4054, Australia.*  
*Tel.: +61 7 3368 2644*  
*Fax: +61 7 3369 3731*  
*E-mail: wcc2001@ccm.com.au*

**Coordination and Organometallic Chemistry of Germanium, Tin, and Lead**

8–12 July 2001  
10<sup>th</sup> International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin, and Lead, Talence, France.

*Dr. B. Jousseume, Laboratoire de Chimie Organique et Organometallique, UMR 5802, Université Bordeaux I, 351 avenue de la Libération, F-33405 Talence Cedex, France.*

*Tel.: +33 (0) 5 56 84 64 43*

*Fax: +33 (0) 5 59 84 69 94*

*E-mail: b.jousseume@lcoo.u-bordeaux.fr*

**Scattering Methods and Polymers**

9–12 July 2001  
20<sup>th</sup> Discussion Conference on Scattering Methods for the Investigation of Polymers, Prague, Czech Republic.

*Dr. Jaromir Lukas, Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Heyrovského nam. 2, CZ-162 06 Praha 6, Czech Republic.*

*Tel.: +420 2 204 0332*

*Fax: +420 2 367 981*

*E-mail: sympo@imc.cas.cz*

## Plasma Chemistry

**NEW**

9–13 July 2001  
15<sup>th</sup> International Symposium  
on Plasma Chemistry (ISPC-15),  
Orléans, France.

*Prof. Jean-Michel Pouvesle,  
Laboratoire GREMI, Université  
d'Orléans, BP 6744, Orléans  
Cedex 2, France*

*Tel.: +33 (0) 2 38417124*

*Fax: +33 (0) 2 38417154*

*E-mail: jean-  
michel.pouvesle@univ-  
orleans.fr*

## Polymer Membranes

16–19 July 2001  
41<sup>st</sup> Microsymposium on  
Polymer Membranes, Prague,  
Czech Republic.

*Dr. Jaromir Lukas, Institute of  
Macromolecular Chemistry,  
Academy of Sciences of the  
Czech Republic, Heyrovskeho  
nam. 2, CZ-162 06 Praha 6,  
Czech Republic.*

*Tel.: +420 2 204 03332*

*Fax: +420 2 367 981*

*E-mail: sympo@imc.cas.cz*

## Organometallic Chemistry

22–26 July 2001  
11<sup>th</sup> IUPAC International  
Symposium on Organometallic  
Chemistry Directed

Towards Organic Synthesis  
(OMCOS 11), Tapei, Taiwan.

*Prof. Tien-Yau Luh, Department  
of Chemistry, National Taiwan  
University,*

*Tapei 106, Taiwan.*

*Tel.: +886 2 23636288*

*Fax.: +886 2 23644971*

*E-mail: tyluh@ccms.ntu.edu.tw*

## Phosphorus Chemistry

29 July–3 August 2001  
15<sup>th</sup> International Conference on  
Phosphorus Chemistry, Sendai,  
Japan.

*Prof. Masaaki Yoshifuji, Depart-  
ment of Chemistry, Graduate  
School of Science, Tohoku  
University, Aoba, Sendai 980-  
8578, Japan.*

*Tel.: +81 22 217 6558*

*Fax: +81 22 217 6562*

*E-mail:*

*yoshiffj@mail.cc.tohoku.ac.jp*

## Analytical Sciences

6–10 August 2001  
International Congress on  
Analytical Sciences 2001  
(ICAS2001), Tokyo, Japan.

*Prof. Tsuguo Sawada, Chair-  
man, Department of Applied  
Chemistry, The University of  
Tokyo, 7-3-1 Hongo, Bunkyo-ku,  
Tokyo 113-8656, Japan.*

*Tel.: +81 3 5841 7236 (or 7237)*

*Fax: +81 3 5841 6037*

*E-mail: icas2001@laser.t.u-  
tokyo.ac.jp*

## Solution Chemistry

**NEW**

26–31 August 2001  
27<sup>th</sup> International Conference on  
Solution Chemistry (27ICSC),  
Vaals, Netherlands.

*Dr. Christian Dux, Conference  
Secretary of 27<sup>th</sup> ICSC, Institute  
of Physical Chemistry, RWTH-  
Aachen, D-52062, Aachen,  
Germany*

*Tel.: +49 241 80 4752 or +49*

*241 80 4712*

*Fax: +49 241 8888 327 or +49*

*241 8888 128*

*E-mail: 27icsc@liquid.pc.rwth-  
aachen.de*

## Ionic Polymerization

**NEW**

22–26 October 2001  
4<sup>th</sup> International Symposium on  
Ionic Polymerization, Crete,  
Greece.

*Dr. Nikos Hadjichristidis,  
University of Athens, Depart-  
ment of Chemistry,*

*Panepistimiopolis, Zografou,  
GR-157 71 Athens, Greece*

*Tel.: +30 1 724 9103*

*Fax: +30 1 722 1800*

*E-mail:*

*hadjichristidis@chem.uoa.gr*

## Biodiversity

3–8 November 2001  
3<sup>rd</sup> IUPAC International Confer-  
ence on Biodiversity (ICOB-3),  
Antalya, Turkey.

## How to Apply for IUPAC Sponsorship

To apply for IUPAC sponsor-  
ship, conference organizers  
should complete an Advance  
Information Questionnaire  
(AIQ). The AIQ form is avail-  
able at <http://www.iupac.org>  
or by request at the IUPAC  
Secretariat, and should be re-  
turned between 2 years and 12  
months before the conference.  
Further information on grant-  
ing sponsorship is included in  
the AIQ and available online.

*Prof. B. Sener, Department of  
Pharmacognosy, Faculty of  
Pharmacy, Gazi University, P.O.  
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## Sweeteners

13–17 November 2001  
2<sup>nd</sup> International Symposium on  
Sweeteners, Hiroshima-Shi,  
Japan.

*Prof. Kasuo Yamasaki, Institute  
of Pharmaceutical Sciences,  
Faculty of Medicine, Hiroshima  
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2002

## Polymer Characterization

7–11 January 2002  
10<sup>th</sup> International Conference on  
Polymer Characterization  
(POLYCHAR), Denton, Texas,  
USA.

*Dr. Witold Brostow, Department  
of Materials Science, University  
of North Texas, Denton, Texas,  
76203-5310 USA*

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or 4337  
Fax: +1 940 565 4824  
E-mail: brostow@unt.edu or  
polychar@marta.phys.unt.edu

### Chromatography

**NEW**

6–8 February 2002  
7<sup>th</sup> International Symposium on  
Hyphenated Techniques in  
Chromatography and Hyphen-  
ated Chromatographic Analyz-  
ers (HTC-7), Bruges, Belgium.  
Robert Smits, Roelsstraat 20, B-  
8670 Oostduinkerke, Belgium  
Tel./Fax: +32 58 514575  
E-mail:  
smitsr@pophost.eunet.be

### Macromolecules

**NEW**

6–10 February 2002  
5<sup>th</sup> Annual UNESCO School and  
South African IUPAC Confer-  
ence on Macromolecules and  
Materials Science, Stellenbosch,  
South Africa.  
Prof. R. D. Sanderson, UNESCO  
Associated Centre for Macro-  
molecules and Materials,  
Institute for Polymer Science,  
University of Stellenbosch,  
Private Bag XI, Matieland  
7602, South Africa  
Tel.: +27 21 808 3172  
Fax: +27 21 808 4967  
E-mail: rds@maties.sun.ac.za

### Bioorganic Chemistry

12–15 May 2002  
6<sup>th</sup> International Symposium on  
Bioorganic Chemistry (ISBOC-  
6), Toronto, Canada.  
Dr. Ronald Kluger, Department  
of Chemistry, University of  
Toronto, Toronto, Canada M5S  
3H6.  
Tel.: +1 416 978 3582  
Fax.: +1 416 978 3482  
E-mail:  
rkluger@chem.utoronto.ca

### Macromolecules

**NEW**

7–12 July 2002  
39<sup>th</sup> International Symposium  
on Macromolecules - IUPAC

World Polymer Congress 2002  
(MACRO 2002), Beijing, China.  
Prof. Fosong Wang, The Chinese  
Academy of Sciences, Beijing  
100864, China  
Tel: +86 10 62563060  
Fax: +86 10 62573911  
E-mail: fswang@mimi.cnc.ac.cn

### Organic Synthesis

**NEW**

14–19 July 2002  
14<sup>th</sup> International Conference on  
Organic Synthesis (ICOS-14),  
Christchurch, New Zealand.  
Prof. Margaret A. Brimble,  
Department of Chemistry,  
University of Auckland, 23  
Symonds St., Auckland, New  
Zealand  
Tel.: +64 9 373 7599, Ext. 8259  
Fax: +64 9 373 7422  
E-mail:  
m.brimble@auckland.ac.nz

### Chemical Thermodynamics

**NEW**

28 July–2 August 2002  
17<sup>th</sup> IUPAC Conference on  
Chemical Thermodynamics,  
Rostock, Germany.  
Prof. A. Heintz, FB Chemie,  
Universitat Rostock,  
Hermannstr. 14, D-18051  
Rostock, Germany  
Tel.: +49 381 498 1852  
Fax: +49 381 498 1854  
E-mail:  
andreas.heintz@chemie.uni-  
rostock.de

### Crop Protection

**NEW**

4–9 August 2002  
10<sup>th</sup> IUPAC International  
Congress on the Chemistry of  
Crop Protection (formerly  
International Congress of  
Pesticide Chemistry), Basel,  
Switzerland.  
Dr. Bernard Donzel, c/o  
Novartis CP AG, WRO-  
1060.3.06, CH-4002 Basel,  
Switzerland  
Tel.: +41 61 697 22 67  
Fax : +41 61 697 74 72  
E-mail:  
bernard.donzel@cp.novartis.com

### Visas

It is a condition of spon-  
sorship that organizers of  
meetings under the aus-  
pices of IUPAC, in consid-  
ering the locations of such  
meetings, should take all  
possible steps to ensure the  
freedom of all bona fide  
chemists from throughout  
the world to attend irre-  
spective of race, religion,  
or political philosophy.  
IUPAC sponsorship implies  
that entry visas will be  
granted to all bona fide  
chemists provided applica-  
tion is made not less than  
three months in advance. If  
a visa is not granted one  
month before the meeting,  
the IUPAC Secretariat  
should be notified without  
delay by the applicant.

### Polymer Science and Technology

2–5 December 2002  
IUPAC Polymer Conference on  
the Mission and Challenges of  
Polymer Science and Technol-  
ogy, Kyoto, Japan.  
Prof. Seiichi Nakahama, Faculty  
of Engineering, Tokyo Institute  
of Technology, 2-12-1  
Ohokayama, Meguro-ku, Tokyo  
152-8552, Japan.  
Tel.: +81 3 5734 2138  
Fax.: +81 3 5734 2887  
E-mail:  
snakaham@polymer.titech.ac.jp