

The News Magazine of the
International Union of Pure and
Applied Chemistry (IUPAC)

CHEMISTRY

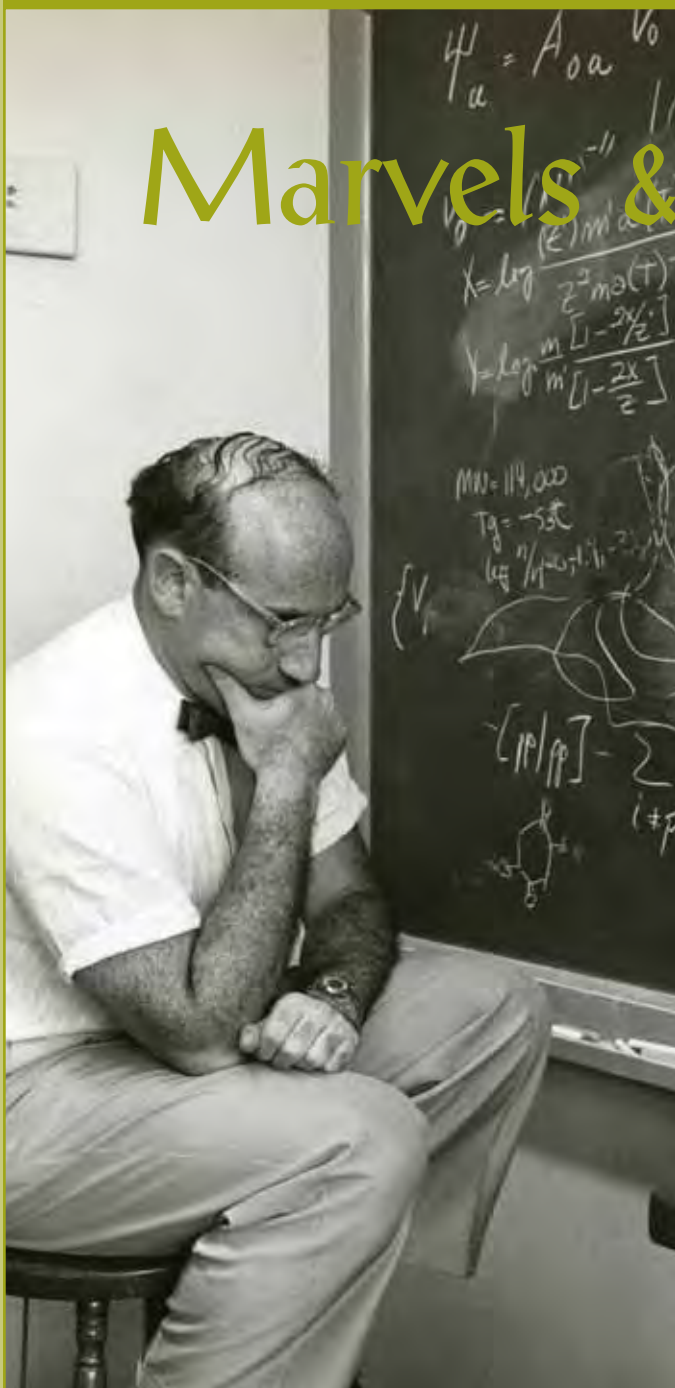
International

May-June 2010
Volume 32 No. 3



Marvels &

Ciphers



A New Exhibit at
Chemical Heritage
Foundation Links
Alchemy and Quantum
Chemistry

Chemistry in Tunisia
Xperimania



CHEMISTRY International

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International Union of Pure and
Applied Chemistry (IUPAC)

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It's that time of year again when the following questions are popping up in many casual discussions: Do you have plans for the summer? Are you traveling anywhere interesting?

For many scientists, this season is an opportunity to attend a conference or two and it is no surprise that the calendar is bursting with



events (24 listed on pages 34 and 35)—all quite interesting. There are the traditional long-standing series and anticipated meetings such as the 39th International Conference on Coordination Chemistry, the 21st International Conference on Chemical Education, or the 18th International Conference on Organic Synthesis, just to name a few. Then, there are

newer events such as the 3rd IUPAC Conference on Green Chemistry, a thriving series that is generating attention.

All IUPAC-sponsored events gain the imprimatur of the Union after a review process that ensures the quality of the scientific program and the host country's assurance that scientists from all countries may participate, regardless of their country of origin. Sponsorship by IUPAC is decided not only on scientific quality, significance, suitability, and evidence of sufficient advanced planning, but also upon suitable time spacing of conferences of a similar type, rotation of leadership, geographical diversity in the international advisory board, and participation of industrial chemists and women as speakers and as members of the IAB.

IUPAC sponsorship also guarantees reduced registration fees for all IUPAC affiliates to most IUPAC-sponsored conferences. If you are already an affiliate, you know the benefits, which also include receiving this publication. If you are not an affiliate and are reading this magazine because you received it as part of a conference registration package, maybe you should consider becoming an affiliate. You will benefit directly through discounted conference registrations, while your contribution will support your chemical society or country organization that adheres to IUPAC. If you are curious, you can find details on the IUPAC website.

To conference organizers and participants, I hope you all have very pleasant and fruitful meetings.

Fabienne Meyers

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www.iupac.org/publications/ci

Cover: Two images from *Marvels & Ciphers*, a new exhibit at Chemical Heritage Foundation that explores connections between alchemy and quantum chemistry. **Left:** Rudolph Pariser in front of a blackboard with quantum calculations, 1950s (courtesy of The Hagley Museum and Library). **Right:** *The Discovery of Phosphorus, 1775*. William Pether (1738–1821). After the painting by Joseph Wright of Derby (1734–1797), mezzotint (gift of Fisher Scientific International, CHF Collections).

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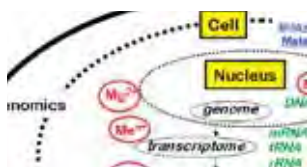
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Secretary General's Column



by *David StC. Black*

I am writing this column in Sofia, Bulgaria, where the IUPAC Bureau met on 17–18 April 2010. Prior to that, there were meetings of division presidents and standing committee chairs, the project and evaluation committees, the International Year of Chemistry Management Committee, and a meeting with presidents of nearby national chemical societies. I can

say with certainty that this Bureau meeting was unique, as it coincided with a burst of activity from an Icelandic volcano, whose plumes of ash caused the grounding of flights across Europe, with concomitant disruption across the world.

While the majority of Bureau members successfully arrived in Sofia, some failed to depart from other European airports, and one arrived without any baggage (not surprisingly flying via Heathrow). Those of us who did arrive then had the problem of leaving, and readers would be quite impressed with the degree of ingenuity shown. European-based members have resorted to bus and train travel, usually about 36 hours in duration, and some managed to set off for the coast in the hope of picking up boats (So far they have not been heard from!). Members from further afield have had little option but to wait for flights to resume. Several got out of Sofia, only to be seriously delayed in other European airports. The rest of us are slowly trickling out as normal services return.

Sofia is a beautiful city with many things to see, but during the meeting the weather was very damp and wintry. Those of us with an enforced stay here have been very fortunate to see the onset of beautiful spring weather. In my case, it allowed the possibility of sketching the splendid St. Aleksander Nevski Memorial Church, with its golden and copper domes, and also attending a chamber music concert by the local Dimitri String Quartet playing Haydn, Schubert, and Schumann, a performance of Puccini's *Turandot* by the National Opera, and the Sofia Philharmonic Orchestra playing Mozart and Mahler. Despite the very warm hospitality of our Bulgarian hosts and the historical, cultural, and scenic attributes of Sofia, it has been difficult to switch to holiday mode and clear our minds (and conversation) of travel concerns. President Nicole Moreau commented that her presidency will remain in the annals of IUPAC folklore, whatever else eventuates!

Incidentally, the Bureau and ancillary meetings dealt with a wide range of issues, many related directly to the International Year of Chemistry. We are now launching vigorously into fund-raising mode for the global events, and an informational leaflet with details of sponsorship opportunities has been sent to our Company Associates initially, and other recipients will follow. Please contact the Secretariat or treasurer if you have suggestions about further possible recipients. We appreciate that each country will undertake its own national programs, publicity, and fundraising.

The IYC website <www.chemistry2011.org> is now fully operational and it is important that all national events, as well as global ones, are listed on that site. The process is simple and clearly outlined, and the accumulation of all events will not only enable good ideas to be transferred, but add greatly to the impact of the IYC. An excellent publicity brochure has also been produced for distribution at all IUPAC conferences. The opening launch of the IYC in Paris in January 2011 and the closing event in Brussels are steadily taking shape, and there was very productive discussion about the organization of unifying events and global experiments.

At this stage there is extensive involvement of the three operational standing committees, the Committee on Chemistry Education, the Committee on Chemistry and Industry, and the CHEMRAWN Committee (Chemical Research Applied to World Needs). The divisions are raising their levels of activity as well. Links with the chemical federations are also designed to enhance the impact of chemical publicity during the IYC 2011. The IYC Management Committee will meet once more in November 2010, at the Secretariat Office in Research Triangle Park, North Carolina, but a serious amount of work will take place between now and then. The IYC Management Committee raised the question of further strengthening the Secretariat staff, to cope with the IYC activity, and the Bureau encouraged a consideration of feasible possibilities: this will now be undertaken swiftly.

The World Chemistry Leadership Meeting (WCLM) is planned for a whole day (Tuesday 2 August) at the General Assembly in San Juan next year, and will address key issues related to IYC 2011. It will present an opportunity for representatives of chemical societies and industry to share thoughts on national events, as well as for IUPAC to expand on future international events. The WCLM will also incorporate the usual round table discussions into the second part of its program. The Congress program for San Juan promises to

be of the highest caliber, with an unprecedented lineup of Nobel Laureate speakers and special sessions.

One of the features of the Bureau meeting was a preview of the Vice President's Critical Assessment, which will be presented to Council next year in San Juan by Kazuyuki Tatsumi. His focus will be on mechanisms to capitalize on the momentum of IYC 2011 into the future. This is a vital issue, both globally and nationally, and already we must seriously think about and plan for "beyond IYC."

In my previous column (May-June 2009 *C*), I mentioned that the United Nations' approval for designating 2011 as the International Year of Chemistry was made easier because it came under the banner of the long-term UN program on Sustainable Development. Following our initial engagement with the UN Economic and Social Affairs Council, IUPAC will participate in some of the technical meetings relating to chemistry as part of the 18th Session of the UN Commission on Sustainable Development (CSD-18), to be held early in May 2010. The themes of CSD-18 are chemicals, mining, the 10-year framework of programs on sustainable consumption, and production, transport, and waste management. Although all of these topics are strongly related to chemistry, one of the major issues for discussion is the Strategic Approach to International Chemicals Management

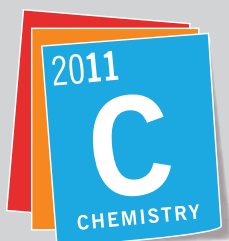
(SAICM). IUPAC has become involved in an NGO advisory capacity in this area, including participation in the related International Conferences on Chemicals Management. It is very important that technical expertise become inserted into discussions at the earliest possible stages, in order to assist in the most sensible and effective future regulations.

The Bureau expressed its sympathy for our Chilean colleagues, who suffered the recent severe earthquake based close to Concepción, where the Executive Committee met in October 2009. Fortunately, none of our friends were directly affected by loss of life, but the Chemistry Department in the university was destroyed by fire, and the hotel where we stayed collapsed.

It was originally intended that both John Jost and his successor as executive director, Terry Renner, would attend the Bureau meeting, but John withdrew because of his mother's imminent death. The Bureau offered its sympathy and condolences to John and his family. In John's absence, Terry did a splendid job coping with all the unexpected circumstances. 🌟

IUPAC Secretary General David StC. Black <d.black@unsw.edu.au> has been involved in IUPAC since 1994 as a committee member of the Division of Organic and Biomolecular Chemistry. He served as division vice president during 2002–2003. He has served as secretary general since 2004.

Celebrate Chemistry



International Year of CHEMISTRY 2011



Goals of the International Year of Chemistry:

- Increase the public appreciation of chemistry in meeting world needs
- Increase interest of young people in chemistry
- Generate enthusiasm for the creative future of chemistry
- Celebrate the 100th anniversary of the Madame Curie Nobel Prize and the 100th anniversary of the founding of the International Association of Chemical Societies

The International Year of Chemistry–2011 will celebrate the achievements of chemistry and its contributions to the well-being of humankind.

Ciphers



Left: Rudolph Pariser in front of a blackboard with quantum calculations, contemplating a molecular model, 1950s.

Courtesy of The Hagley Museum and Library.

Right: *The Discovery of Phosphorus*, 1775 William Pether (1738–1821). After the painting by Joseph Wright of Derby (1734–1797). Mezzotint.

Gift of Fisher Scientific International, CHF Collections.

The mysterious cold glow of phosphorus, the secrecy and excitement surrounding its discovery by Hennig Brand in 1669, the awe of those witnessing Brand's demonstrations, and the ensuing frustrated desire of other chemists to possess Brand's secret encapsulate the types of complex dynamics that can surround new knowledge. The newly discovered element was not understood or yet practical. But it fulfilled a well-known requirement of the philosophers' stone, being made from low or despised matter (human urine). The event could only capture and inflame imaginations and, as the image demonstrates, might be viewed as a divine gift.

process imaginable. The results have often dismayed or dazzled even the scientists, let alone the uninitiated. And as empirical knowledge grows, explanations for these phenomena are born, discarded, and rewritten.

In the 20th century the comfortably solid ground laid by the experimental work of generations of scientists became again a strange and surprising world thanks to quantum theories. The mathematics of uncertainty and probability that supports the platform driving our modern technologies is "insider knowledge" as wondrous and unfathomable as the alchemists' fabled philosophers' stone. From alchemical times to our current quantum-enabled century, science has given us marvels to wonder at and ciphers to decode.

The Theory Changes—The Struggle to Understand Continues

A tension exists between the minutiae of what is observed, discovered, or recorded and whatever big idea has been proposed that brings meaning and gives context to the data. Knowledge expands only after results from studies and experiments accumulate and challenge what is already "known."

The investigator may have an intense relationship with what is investigated. A sort of intimacy develops

between the observer and the observed, an intimacy vicariously felt by the bystander. With the introduction of modern instruments, observation has become indirect. But with familiar bridging vocabularies to interpret data, users can experience the instruments as extensions of their own senses. Disconcertingly, however, when making observations at the atomic level, the observer interferes with the data gathering.

The observer wants to make sense of the data. Describing what is seen and developing a consistent language for communicating it to others has been a centuries-long struggle for natural philosophers and science investigators of all types.

The first tools for data gathering were the investigator's senses: eyes, ears, nose, mouth, and hands. They are still valuable. But when words and senses are inadequate, tools for communicating become ciphers to the uninitiated: symbols and mathematics, metaphor and allegory. An insider and outsider dynamic is created.

The Alchemist

Symbolic language, metaphor, and allusion helped preserve secrecy and convey the multiple layers of meaning that infused early modern thinking. Alchemists did, in fact, observe remarkable things, observations

Marvels & Ciphers

that would give them hope that they were on the right track in their search both to understand the mysteries of matter and to prepare the philosophers' stone. Likewise, there is evidence that some alchemical imagery was not artistic invention but instead reflects what alchemists actually observed.

"Envision knowledge based on practical experience and then infuse this understanding with symbolic imagery and you may have made space for alchemical thinking. Add a dollop of music and poetry and you may be ready to enter a doorway into the mind of an alchemist."

—Lawrence Principe

The Quantum Chemist

The quantum chemist, like the alchemist, had practical goals: to create meaningful ways to think about the surprising behavior of elementary particles. Chemists, physicists, and mathematicians, enabled by the ever-more-powerful computer, were able to frame and answer questions that led to some of our most basic everyday technologies. The laws of physics when applied to chemistry can be used for simple applications: for example, the hydrogen atom has one proton and one electron. But the mathematical calculations become impossible to do for the hundreds of particles in a typical molecule.

In 1951, DuPont's Jackson Laboratory had a problem. New synthetic fibers were being developed and new principles for dye selection needed to be created. Rudolph Pariser, who had just joined Jackson Laboratory, wondered whether applying quantum chemistry could hold an answer to the color of dyes. He contacted Robert Parr, an expert in quantum chemistry, and together they developed a new theoretical method, the P-P method (later developed into the Pariser-Parr-Pople method). Using a brand-new state-of-the-art IBM 701 computer, Pariser was then able to calculate the color of complex molecules such as dyes.

Thus, with the advent of the computer, clever approximation techniques, like the Pariser-Parr-Pople method, expanded practical applications of quantum chemistry and were early "proof" that quantum mechanics led to realistic predictions of molecular energies and shapes.

Public Perceptions

In the 17th century, the alchemists actually were making advances in chemistry even when their theoretical

base was wrong. By developing experimental methods, the alchemists made improvements in the lab that led to modern chemistry and even atomic theory. But in the popular mind of the time, alchemists were charlatans or worse. The painting *The Alchemist Takes Fire* makes this view very clear. Many other paintings in this popular 17th-century genre of art have similar themes showing the low place of the alchemist in European society.

Alchemists were also part of daily life in cities and towns. They were barbers, surgeons, dentists, dispens-



The Alchemist's Experiment Takes Fire, 1687
Hendrick Heerschop (1620-1690). Oil on canvas.
Gift of Fisher Scientific International, CHF Collections.

The alchemist genre contained a certain flavor of humorous ridicule that delighted 17th-century Dutch society. Genre paintings often show family life intertwined with work. The paintings of alchemists in their workshops put in play puns, traditional sayings, aphorisms, and symbols. We see very few depictions of explosions, although they must have been common since alchemists often heated materials in fragile glassware. The explosion shown here is a scene of failure. The disaster is paired with the alchemist's wife wiping the baby's bottom, which puns on the archaic Dutch usage where *alchemist* (alchemist) can also mean "all is lost," and by extension, "all is crap." Sadly, the alchemist's failures may be ongoing, as is the necessity of the mother to continually wipe her baby's bottom.

A New Exhibit Links Alchemy and Quantum Chemistry

ers of medicines of questionable value, and otherwise subjects of scorn and satire in their communities. Quantum chemists, on the other hand, are as mysterious as their work to most people in modern culture. They are remote from the daily life of any community outside a lab or research facility. Their work defies image making, but does lead to occasional jokes—a brand of humor that requires some level of scientific training to understand:

A policeman stops Heisenberg for speeding, and the cop asks: "Sir, do you have any idea how fast you were driving?"

"No," replies Heisenberg, "but I know where I am!"

Heisenberg is lost and asks a policeman, "Where am I?" to which the intergalactic traveler in the disguise of a cop answers, "I don't know, but I know where you are headed."

Q: Why was Heisenberg bad in bed?

A: Because when he had the time, he didn't have the energy, and when he had the position, he didn't have the momentum.



A Chymist, 1 June 1829. W.B. Cooke. Etching.
Gift of Fisher Scientific International, CHF Collections.
Photograph by Gregory Tobias.



"Science" trading card,
early 20th century.
Churchman's Cigarettes,
Imperial Tobacco
Company.
Gift of William Helfand,
CHF Collections.

Two atoms are walking along when one of them trips and lands on the floor.

"Are you all right?" inquires the first.

"No!" replies the second, "I've lost an electron!"

"Are you sure?" asks the first.

"Yes, I'm positive!" answers the second.


So Different, Yet Similar

"We must be clear that when it comes to atoms, language can be used only as in poetry. The poet, too, is not nearly so concerned with describing facts as with creating images and establishing mental connections."

—Niels Bohr to
Werner Heisenberg, 1920

Both the alchemist and the quantum chemist relied on symbol to communicate what was beyond their abilities to observe. For the alchemists, working with just five senses and a flawed theory of matter, it is amazing how much they contributed to the understanding of the world around us. We hear more about alchemy's failed attempts to transmute lead into gold than about its pragmatic achievements, such as making medicines, glass, perfumes, and gunpowder; refining metals and making alloys; making pigments and dyes; and learning to separate and isolate various chemicals. Individuals investigated basic questions like the phenomenon of colors created by prisms or the chemical nature of the body's organs.

Visit CHF or Visit Online

Linking the world of alchemy and quantum chemistry brought together many parts of the collections and library resources at CHF in an exhibit expressly designed for its museum space. *Marvels & Ciphers* will be open for the rest of 2010 for those who might be traveling to Philadelphia during this year. For those who cannot travel to Philadelphia this year, visit the exhibit online. 

 www.chemheritage.org

Chemistry in Tunisia

IUPAC welcomes the Tunisian Chemical Society as one of the latest National Adhering Organization to have joined the Union.

The Tunisian Chemical Society: A Necessity for a Developing Country

by Mohamed Jemal

Tunisia is an Arabic country of about 10 million situated on the south side of the Mediterranean basin. Because of its geographical position, the country has been occupied by various civilizations. For several centuries, Carthage City was the cradle of one of the earliest civilizations in the world. The founding of Carthage by the Phoenicians dates to the 814s BC.

Tunisia's independence from French colonization occurred in 1956. Since then, education has become the most important part of the state budget. In the first decades after independence, many primary schools were built all over the country, even in the most remote villages. This was followed by the creation of many secondary schools. In 1958, the first Science University was formed, which offered the "Maitrise" and featured a French teaching staff. Thanks to the long-term view of the political leaders at that time, most of the graduate students were sent to France to prepare their theses. Some remained in France, but the majority came back to teach at the young university.

Today, Tunisia boasts 13 universities with about 300 000 students—among them a large proportion of scientists—who are taught by Tunisian professors. This rapid and continuous expansion of popular education

has improved literacy and produced well-informed citizens, but as with every massive educational policy, it suffers from some drawbacks.

The Case of Chemistry

Chemistry activity in Tunisia is focused mainly on the extraction and transformation of phosphates, leather treatment, olive oil production and analysis, steel manufacturing, petroleum refining, and food and detergent production.

The Société Chimique de Tunisie (SCT) was launched in 1978 through the initiative of a few young chemists returning from France after stays of four to seven years. Its aim is to promote chemistry in the country through the organization of chemistry meetings, participate in the science curricula commissions launched by the Education Ministry, encourage university-industry connections, and to make citizens aware of the importance of chemistry in everyday life.

The first national meeting organized by SCT was held in November 1979; from that date on, Journées Nationales de Chimie (JNC), national chemistry conferences, have been organized every two years. These meetings attract a large number of young chemists, most of whom could not afford to travel abroad to a chemistry conference.

The SCT used to organize two thematic meetings: the Journées de Chimie Organique (JCO) and the Journées de Chimie du Solide (JCS). The last JCO was combined with the 6th Mediterranean Colloquium on Heterocyclic Chemistry (TRAMECH 6), which took place in Hammamet in November 2009. The last JCS was held in Zarzis (450 km south of Tunis) in December 2009. Two conferences are scheduled for 2010. From

14-16 May 2010, the 41st Journées de Calorimétrie et d'Analyse Thermique will be held in partnership with the Applied Thermodynamics Laboratory, Tunis, under the sponsorship of the Association Française de Calorimétrie et d'Analyse Thermique. From 19-22 December 2010, the 16th JNC will be held, which is expected to have more than 400 participants. As with the previous JNC, the SCT Bureau (12 members) will



concurrently hold a General Assembly for discussing business matters of the SCT.

SCT meetings feature national and European lecturers on special topics and offer young chemists the opportunity to discuss their results in oral and poster sessions. The SCT also organizes workshops in partnership with the Education Ministry on teaching chemistry in secondary schools and at universities, and with industry on such topics as chromatography, pollution, and energy efficiency. It also participates in activities such as the Science Festivities organized by Tunis El Manar University and takes part in the commission launched by the Higher Education and Research Ministry to prepare for the International Year of Chemistry.

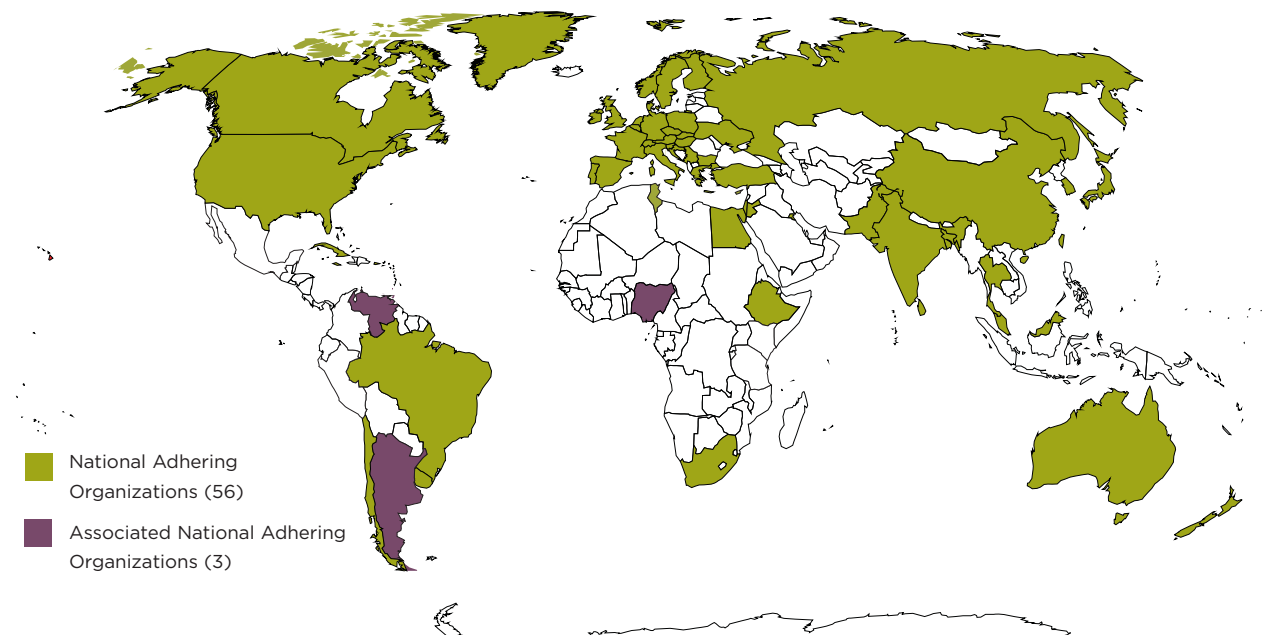
SCT publishes the *Journal de la Société Chimique de Tunisie*, a twice-a-year, peer-reviewed journal indexed by CAS. It is a member of the Arab Union Chemists and was among the founders of the Federation of African Societies of Chemistry.

SCT adhered to IUPAC in 1990 as an ANAO member and just recently became a NAO member. This new status offers SCT new opportunities at the international level. 🌐

Professor Mohamed Jemal <jemal@planet.tn> is president of the Tunisian Chemical Society and contributed to its creation in 1978.

👉 www.sctunisie.org

IUPAC Around the World (as of March 2010)



As of 3 March 2010, IUPAC counts 56 full members or National Adhering Organizations (NAOs), and 3 Associated National Adhering Organizations (ANAOs). The most recent adhering members are Cyprus (3 March 2010), Tunisia (4 February 2010), and Luxembourg, Malaysia, Sri Lanka, and Thailand (1 January 2010).

The Membership Relations Committee, currently chaired by Past President Jung-Il Jin, appreciates your feedback. Inquiries should be directed to IUPAC Executive Director Terry Renner at <secretariat@iupac.org>.

An informal review of members' benefits, duties, and functions is available online at <http://media.iupac.org/general/hints.html>.

Xperimania

FROM MOLECULES TO MATERIALS

An Industry-Academic Partnership

by Ann Whent

There are not enough young scientists to meet our needs. This has been a growing concern for the chemical industry as a whole, and the petrochemical industry in particular, over the past few years. How can we make science fun and therefore more attractive to young people?

Four years ago, the Association of Petrochemicals Producers in Europe (Appe) decided to confront the challenge of declining interest in science by implementing an educational program to raise awareness of petrochemistry topics, products, and career opportunities via inquiry-based teaching methods.

It was important, however, to find support to assist Appe in this ambitious project. As it needed to contact both teachers and students, it soon became obvious that European Schoolnet (EUN) would be the ideal partner. EUN is a network of 28 ministries of education in Europe, which was founded in 1997 to bring about innovation in teaching and learning. It supports teachers, schools, and researchers through projects, competitions, activities, communication, and information exchange.

Xperimania—From Molecules to Materials was launched on 17 September 2007. It focused on 10- to 20-year-old secondary school students across the 27 EU member states, and was therefore available in the 22 EU languages.

A dedicated website—www.xperimania.net—supported various activities for the first year. Students were invited to take part in two competitions, and to participate in online chats with industry experts. One competition involved setting up an easy and fun experiment in science relating to petrochemistry and materials. The other asked for contributions to a timeline of scientific discoveries in the field of materials from 1800 to the present day.

The jury was fascinated by the diversity and high quality of the entries, which were original, creative, and pedagogical.

After eight months, organizers received a total of 447 entries from 18 different countries for both competitions. Xperimania succeeded in stimulating the scientific and analytical observation abilities of approximately 650 students who participated in the competitions. The winners, three for each activity either as a team or as an individual, were invited to Brussels for the prize ceremony. They were also invited to visit a major petrochemical research center.

The finalists' work showed that the pupils had dedicated a great deal of time and energy to their projects. The jury was fascinated by the diversity and high quality of the entries, which were original, creative, and pedagogical, while giving an interesting perspective on the future. Teams of Bulgarian, Hungarian, and Cypriot students were prize winners in the experiment category and individual Maltese, Hungarian, and Polish students were the winners in the timeline category.

Some key lessons could be drawn from an early survey of the participating teachers. Based on the assumption that petrochemistry is a relatively new science, teachers indicated that 87 percent of them thought that Xperimania provided an attractive learning environment for their students. Eighty percent of the students changed their perception of petrochemistry and science careers during the project and 92 percent of respondents confirmed their interest in Xperimania II.

"This is a fascinating experience" concluded Pierre de Kettenis, executive director at Appe. "We feel confident that in a few years from now we'll be able to measure the return on our investment in terms of



Students wait for the prize ceremony to begin in Brussels.

cerned that products they come in contact with may in some way be unsafe.

At the closing of Xperimania II in June 2009, despite its successes, organizers were facing many industry budget constraints as a consequence of the financial crisis. Xperimania had gained both in reputation and popularity, with 115 000+ web visitors. The participation rate demonstrated an ever-growing enthusiasm from students and teachers all over Europe.

The announcement that 2011 would be the International Year of Chemistry was a boost to the Xperimania project since one of the main objectives of the year is to increase the interest of young people

in chemistry. This is exactly what Xperimania had been doing successfully since 2007. It was finally decided

that Xperimania III would act as a bridge to the International Year of Chemistry.

Rather than hold a competition in 2009-2010, Appe put out a call to schools to be considered for a visit from Xperimania Science Ambassadors. By the December 15 deadline, 432 schools had registered. In six of them, Xperimania ambassadors will conduct a two-hour workshop with inspiring and interactive

chemistry and physics experiments that enable students to become directly involved in science. The ambassadors will also provide easy tips on how to present the experiment results to the general pub-



Spanish students with equipment bought with their prize funds.

Off to a Good Start in Romania

The Xperimania Science Ambassadors received a warm welcome on their first school visit, which was to the Traian Vuia school in Tăuții Măgherauș, Maramureș, Romania, on 23 February 2010. Students and teachers enjoyed the Xperimania workshops and learned more about chemistry and physics through fun experiments.

During the one-day visit, Xperimania ambassadors held four workshops attended by more than 80 students. Both students and teachers benefitted from hands-on

experiments, which helped them to discover different materials and their properties and also to



Xperimania science ambassadors demonstrating to students in Romania.

see how they behave under various everyday circumstances. The ambassadors also showed the students various methods that sci-

entists use to perform research. Students from a number of neighboring schools also participated in the final workshop.

The students of Maramureș left a very positive impression on the visiting ambassadors. "We managed to demonstrate that science can be fun," says Ann Whent, representing the Association of Petrochemical Producers in Europe. "We are confident that this kind of workshop will help some stu-

dents choose to continue their education in science. There are many job opportunities waiting for them!"

An Industry-Academic Partnership



Students in Romania during an Xperimania workshop in February 2010.

lic in the form of a lab report. The selected schools were announced in January 2010, and the Xperimania Ambassadors will pack their bags and get on the road for visits in February–April 2010.

Due to a high-level of interest among schools, the jury decided to increase the number of winning schools from three to six, and to visit four countries instead of the original three. The winning schools were as follows:

- Romania: Traian Vuia in Maramures
- Portugal: E.B. 2,3 de Alcanede in Alcanede
- Slovenia: Osnovna šola heroja Janeza Hribarja in Stari trg pri Ložu
- United Kingdom: Bartley Green School, St Francis Primary School, and Highters Heath Community School in Birmingham

In three years, Xperimania has succeeded in being recognized as a credible education resource by the educational community in Europe. It has demonstrated some of the benefits petrochemistry can bring to everyday life and has provided a global understanding of the processes involved. The International Year of Chemistry represents a unique opportunity to show to younger generations and the public at large how the chemical industry can help provide solutions to climate change and other of society's biggest challenges.

Ann Whent <awh@cefic.be> is communication counsellor for Appe, Cefic Industry Sector.

 www.xperimania.net



“It was impressive how, in spite of the language barrier, the pupils were able to follow the explanations and participate so actively,” said one ambassador. “Also, the teachers were very active. Sometimes it was difficult to stop them from answering the questions themselves—they wanted to be students as well!”

According to one of the teachers, this was “an important event in the school and in the life of the small town.” People from the local council and the town’s mayor, Anton Ardelean, were present at the school to welcome the Xperimania Ambassadors. Furthermore, several people from the school inspec-

torate and the commander of the local police department were introduced to the ambassadors. In addition, members of the local press reported on, took photos of, and filmed the event.

At the close of the day, teachers Aneta Pop and Franciska Szilagyi, who had successfully applied for the ambassadors’ visit, organized a visit to a local museum as well as a traditional Romanian dinner for the ambassadors, some school teachers, and the mayor of the town.



Students and teachers from Maramureș, Romania, and the surrounding area.

2010 Thieme–IUPAC Prize Awarded to Phil S. Baran

Thieme Publishers, IUPAC, and the editors of *SYNTHESIS*, *SYNLETT*, *SYNFACTS*, and *Science of Synthesis* are pleased to announce that the 2010 Thieme–IUPAC Prize in Synthetic Organic Chemistry has been awarded to Phil S. Baran of the Scripps Research Institute. Professor Baran becomes the 10th recipient of the prize, and joins a select group of scientists under the age of 40 years whose research has had a major impact on the field of synthetic organic chemistry. The prize, which is presented every two years and includes an award of EUR 5000, will be given to Phil Baran at the Thieme–IUPAC lecture on 3 August 2010 at the ICOS-18 conference in Bergen, Norway. See back cover for details.

 www.thieme-chemistry.com/our-service/thieme-iupac-prize.html

Han E.H. Meijer Garners 2010 DSM Performance Materials Award

Han E.H. Meijer, professor of polymer technology and scientific director of the Research School Eindhoven Polymer Laboratories at the Eindhoven University of Technology, The Netherlands, has been named as the recipient of the DSM Performance Materials Award 2010 in recognition of his exceptional contributions to the advancement of the materials sciences. Meijer will receive the award—which carries a cash prize of EUR 50 000—at the IUPAC Macro 2010 Congress in Glasgow, UK, on 12 July. Meijer will deliver an award lecture on the occasion, titled “Mechanical Performance of Polymers.”



In conjunction with the presentation of the award, a special DSM–IUPAC Performance Materials Symposium will be held at the Congress on 12 July. The names of the symposium speakers will be announced on the conference website at <www.MACRO2010.org>.

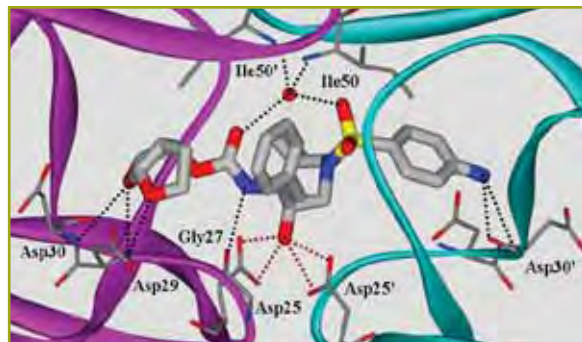
 www.dsm.com/en_US/html/da/pm_award_2010.htm

Arun K. Ghosh is Awarded the 2010 IUPAC–Richter Prize

The 2010 IUPAC–Richter Prize in Medicinal Chemistry has been awarded to Dr. Arun K. Ghosh, Ian P. Rothwell Distinguished Professor at Purdue University.

Ghosh received the award in recognition of his structure-based design of HIV-1 protease inhibitors using a novel concept of “backbone binding” to withstand drug resistance. This work produced the novel drug darunavir, which was approved by the FDA in 2006 as the first treatment for multidrug-resistant HIV. He has also pioneered structure-based design of β -secretase inhibitors for treatment of Alzheimer’s disease. One such compound has now entered into advanced clinical trials.

The IUPAC–Richter Prize, comprising a plaque and USD 10 000, will be presented on 7 September 2010 at the 21st European Federation of Medicinal Chemistry International Symposium in Brussels, Belgium. The plaque will be signed by Nicole Moreau, president of IUPAC, Erik Bogsch, chief executive officer of Gedeon Richter plc (Budapest, Hungary), and Robin Ganellin, chair of the IUPAC–Richter Prize selection committee. As the prizewinner, Ghosh will present an award lecture at the symposium.



Darunavir forms an important hydrogen bonding network with protein backbone (black dotted lines).

Arun Ghosh was born and raised in Calcutta, India. He studied chemistry at the University of Calcutta and received his B.Sc. degree in 1979. He then attended the Indian Institute of Technology at Kanpur to obtain a master's degree in chemistry in 1981. He received his Ph.D. from the University of Pittsburgh in 1985. He spent three years as a postdoctoral research fellow at Harvard University. In 1988, he joined Merck Research Laboratories at West Point, Pennsylvania, as a medicinal chemist where he worked on several areas including HIV protease and reverse transcriptase.

In 1994 Ghosh began his independent academic career at the University of Illinois, Chicago, eventually becoming professor of chemistry in 1998. In 2005, he moved to Purdue University, Indiana, with a joint appointment in the Department of Chemistry and the Department of Medicinal Chemistry and Molecular Pharmacology. He became the Ian P. Rothwell Distinguished Professor in 2009.

Ghosh received the ACS Arthur C. Cope Senior Scholar Award in 2010 and the Robert Scarborough Award in Medicinal Chemistry in 2008. He is a founding scientist at CoMentis, Inc., Oklahoma City (2002).

 www.iupac.org/web/nt/2010-04-14_IUPAC-Richter_prize

L'Oréal-UNESCO Awards for Women in Science 2010 Announced

Europe: Anne Dejean-Assémat (France), director of the Laboratory of Nuclear Organisation and Oncogenesis at the Pasteur Institute, as well as the INSERM Research Unit of Molecular and Cellular Biology of Tumors, "for the elucidation of the molecular and cellular mechanisms at the origin of certain cancers in humans."

Africa & the Arab States: Rashika El Ridi (Egypt), professor of Immunology, Zoology Department, Faculty of Science, Cairo University, "for paving the way towards the development of a vaccine against the tropical disease Schistosomiasis/Bilharzia, which affects over 200 million people."

Asia-Pacific: Lourdes J. Cruz (Philippines), professor at the Marine Science Institute at the University of the Philippines Diliman in the Philippines, "for the discovery of conotoxins produced by certain marine



L'OREAL-UNESCO Award Laureates 2010 (left to right): Prof. Anne Dejean-Assemat (France), Prof. Lourdes J. Cruz (Philippines), Prof. Alejandra Bravo (Mexico), Prof. Rashika El Ridi (Egypt), Prof. Elaine Fuchs (USA).

Photographer: Christophe Gibbaud.

snails that can serve as painkillers and pharmaceutical probes to study brain function."

North America: Elaine Fuchs (USA), professor, Laboratory of Cellular Biology, The Rockefeller University, New York, "for the discovery of stem cells and key processes involved in skin development, maintenance, and repair."

Latin America: Alejandra Bravo (Mexico), professor at the Institute of Molecular Microbiology of the Universidad Nacional Autonoma in Cuernavaca, Mexico, "for her understanding of the mechanism of a bacterial toxin that acts as an environmentally friendly insecticide."

The preceding winners of the 12th Annual L'Oréal-UNESCO Awards For Women in Science received their prizes at a ceremony on 4 March at UNESCO, in the presence of Irina Bokova, director general of UNESCO, and Sir Lindsay Owen-Jones, chairman of L'Oréal and of the L'Oréal Corporate Foundation. UNESCO-L'Oréal also awarded 15 International Fellowships to doctoral and post-doctoral women to allow them to pursue their research in host laboratories outside their home countries.

 www.loreal.com

In Memoriam—Ari Horvath

Ari Horvath, a longtime member of the IUPAC solubility data community, died in February 2010 at age 77 in Warrington in Cheshire, UK.

Even those who were close enough to Ari to benefit from his generosity and kindness, who knew of his passion for opera and classical music, who recognized the great love he had for his wife Joan and daughter Helen, and who, despite his modesty, became aware of the diverse and extensive contributions he made to science, usually did know about his background. Ari had escaped to Sweden from Hungary following the 1956 uprising, and rapidly learned Swedish in order to complete his chemistry degree. He moved to the UK in 1965 and worked as a research scientist at ICI Mond Division until his retirement in 1993.

Ari Horvath was a member of the small group of physical chemists whose strong support in the late 1970s and early 1980s enabled the late Steven Kertes

to achieve his vision of establishing the definitive and comprehensive Solubility Data Project. When his personal circumstances prevented his travelling to the annual planning meetings that tended to alternate between Europe and North America, he continued to contribute critically assessed data compilations.

Ari's professional activities within IUPAC resulted in the publication of four volumes in the Solubility Data Series which he coedited with Forrest Getzen: Halogenated Benzenes, Toluenes, and Phenols with Water (1985); Halogenated Methanes with Water (1995); Halogenated Ethanes and Ethenes with Water (1999); and Halogenated Aliphatic Hydrocarbons C₃-C₁₄ with Water (1999).

As well as his reference text Halogenated Hydrocarbons (1982) in the field of liquid-liquid miscibility, Ari also published in other areas of science, notably Molecular Design (1992) and Calculations in Industrial Chemistry (1996).

3rd International IUPAC Conference on

GREEN CHEMISTRY

Road to GREENER INDUSTRY



August 15–18, 2010

The Westin Ottawa, Ottawa, Ontario, Canada

www.icgc2010.ca



Second Polymer International-IUPAC Award for Creativity in Applied Polymer Science or Polymer Technology



Awarded to:

Professor Molly Stevens

Institute of Biomedical Engineering and Department of Materials, Imperial College London, UK



IUPAC POLYMER DIVISION



The Executive Editorial Board of Polymer International and the IUPAC Polymer Division are pleased to announce the second winner of the Polymer International-IUPAC Award for Creativity in Applied Polymer Science or Polymer Technology.

Professor Stevens, who has developed novel approaches to tissue engineering that are likely to prove very powerful in the engineering of large quantities of human mature bone as well as other vital organs, formerly held a postdoctoral position in the field of tissue engineering at the Massachusetts Institute of Technology, USA with Professor Robert Langer.

In the process of commercializing the technology, much of which makes use of novel polymer composites and nanomaterials, she became the co-founder of BioCeramic Therapeutics and is involved in setting-up human clinical studies for bone regeneration. Professor Stevens leads a large multidisciplinary group at Imperial College London, which conducts research into the directed differentiation of stem cells, the design of novel bioactive scaffolds and new approaches towards tissue regeneration and biosensing. Her work has been recognized by a number of awards including the Jean Leray Award from the European Society for Biomaterials (2009), the TR100 (Top 100 Young Innovators in 2004) by Technology Review and the Ronald Belcher Memorial Lecture Award from the Royal Society of Chemistry (2000). She is the recipient of numerous grants including a European Research Council (ERC) individual investigator grant for pioneering biomaterials research as applied to biosensing and regenerative medicine.

The winner was selected by members of the scientific committee representing Polymer International and the IUPAC Polymer Division:

Professor Kurt Geckeler
(Editor-in-Chief of Polymer International)

Professor Graeme George
(Polymer International, Australasia)

Professor Jiasong He (IUPAC, Far East)

Professor Richard Jones (Polymer International/IUPAC, Western Europe)

Professor Pavel Kratochvil (Polymer International/IUPAC, Eastern Europe)

Professor Chris Ober (President of IUPAC Polymer Division, The Americas)

We extend our congratulations to Professor Molly Stevens, who wins \$5,000 and will present her award winning keynote lecture at MACRO 2010.



Professor Molly Stevens will present her keynote speech at MACRO 2010: 43rd IUPAC World Polymer Congress

Guidance for Substance-Related Environmental Monitoring Strategies Regarding Soil and Surface Water

In environmental polices, substance-related monitoring is an essential tool for risk assessment. The soundness of policy decisions, including risk management measures, are directly related to the reliability of the environmental monitoring programs. In addition, monitoring programs are needed for identifying new and less-investigated pollutants of concern in different environmental media.

Scientifically sound and feasible monitoring concepts strongly depend on the aim of the study. The proper definition of questions to be answered is of pivotal importance. Therefore, this new IUPAC project will address different approaches to substance-related monitoring for soils and surface water, including sediment.

The project objectives are as follows:

- provide guidance for the selection, elaboration, and performance of substance-related monitoring strategies regarding soil and surface water sampling
- provide an overview of available, scientifically sound and feasible monitoring strategies for substance-related environmental monitoring
- discuss advantages and shortcomings of different strategies, requirements for technical and personal equipment, and quality assurance

The aim of investigative monitoring or “snapshot monitoring” is to get a first impression of the pollution of selected areas or input scenarios (e.g., monitoring of inputs via sewage sludges within a certain region) and to screen for new and less investigated pollutants of environmental concern. This investigative monitoring often does not fulfill the criteria for being “representative” since it does not involve systematic selection of sampling sites for sheer pragmatic reasons.

Trend monitoring and compliance monitoring operate within well-selected sampling sites. The aim of this study type is to accurately trace the concentrations over a certain time period, thus allowing detection of seasonal variations, accidental inputs, and the effectiveness of regulations.

Storage of samples and repeated sampling at well-selected and carefully documented sites can lead to retrospective monitoring as performed by environmental specimen banks. In this context, the proper documentation of related meta-data is paramount to explain and interpret the observations on the “time-capsuled” samples. Sample handling, storage, and the analysis of the samples are important steps.

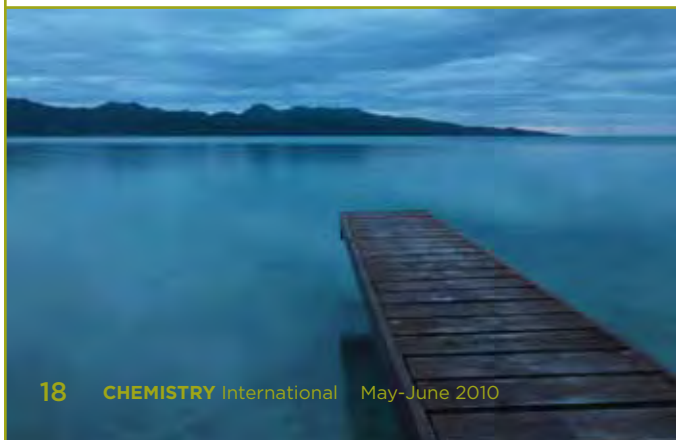
For more information and comments, contact Task Group Chair Werner Kördel <koerdel@ime.fraunhofer.de>.

 www.iupac.org/web/ins/2009-048-1-600

Evaluated Kinetic Data for Atmospheric Chemistry

The Subcommittee on Gas Kinetic Data Evaluation for Atmospheric Chemistry is providing critically reviewed recommended kinetic and mechanistic data for reactions important in the atmosphere. These data may be incorporated into the next generation of climate and air quality models which describe chemical processes occurring on local, regional, and global scales and which will guide policy development. Data such as these form the backbone of any predictive numerical simulations of the global climate upon which potentially far-reaching political decisions are based.

This project will support the continuous updating of the web-based database <www.iupac-kinetic.ch.cam.ac.uk> on atmospheric reactions located at the Centre for Atmospheric Science in the Department of Chemistry, University of Cambridge, UK. The migration to the web was begun in 2001 (IUPAC project 1999-037-2-100) and was essentially concluded in 2008 at the end of project 2007-001-2-100. The website contains approximately 1000 data sheets covering gas phase reactions, photolysis reactions, and heterogeneous reactions on liquids and on solids. Parallel to the ongoing updating, completing, and reevaluation of the web-based data, “snapshots” of certain parts of the database are published in a series of peer-reviewed articles in *Atmospheric Chemistry and Physics*.¹⁻⁵



It is clear that this effort should continue in view of the considerable scientific activity in this field and the new results it generates. The subcommittee is currently expanding the existing database to consider new gas phase data sheets and recommendations for selected complex hydrocarbon reactions, including aromatic species and haloalkanes and new data sheets for heterogeneous reactions on ice, mineral dust, liquid water, and sulfuric acid surfaces.

References

1. R. Atkinson, et al., Evaluated kinetic and photochemical data for atmospheric chemistry: Volume I—gas phase reactions of O_x , HO_x , NO_x , and SO_x species, *Atmos. Chem. Phys.*, 4, 1461-1738 (2004).
2. R. Atkinson, et al., Evaluated kinetic and photochemical data for atmospheric chemistry: Volume II—gas phase reactions of organic species, *Atmos. Chem. Phys.*, 6, 3625-4055 (2006).
3. R. Atkinson, et al., Evaluated kinetic and photochemical data for atmospheric chemistry: Volume III—gas phase reactions of inorganic halogens, *Atmos. Chem. Phys.*, 7, 981-1191 (2007).
4. R. Atkinson, et al., and T. J. Wallington, Evaluated Kinetic and Photochemical data for Atmospheric Chemistry: Volume IV—Gas Phase Reactions of Organic Halogen Species, *Atmos. Chem. Phys.*, 8, 4141-4496 (2008).
5. J. N. Crowley, et al., Evaluated Kinetic and Photochemical data for Atmospheric Chemistry: Volume V—heterogeneous reactions on solid substrates, *Atmos. Chem. Phys.*, in press.

For more information and comments, contact Task Group Chair Tim J. Wallington <twalling@ford.com>.

 www.iupac.org/web/ins/2009-031-1-100

In early 2010, the IUPAC Subcommittee for Gas Kinetic Data Evaluation began using an RSS feed for its website.



 www.iupac-kinetic.ch.cam.ac.uk/feed/

For those unfamiliar with RSS feeds, Glenn Carver suggests a useful description provided by the BBC: <http://news.bbc.co.uk/1/hi/help/3223484.stm>

Provisional Recommendations

Provisional Recommendations are drafts of IUPAC recommendations on terminology, nomenclature, and symbols made widely available to allow interested parties to comment before the recommendations are finally revised and published in Pure and Applied Chemistry. Full text is available online.

Glossary of Terms Used in Photocatalysis and Radiocatalysis

This glossary of terms covers phenomena considered under the very wide terms “photocatalysis” and “radiocatalysis” or “radiation catalysis.” A clear distinction is made between phenomena related to either photochemistry and photocatalysis or radiation chemistry and radiocatalysis. Consistent definitions are given of terms in these areas, as well as definitions of the most important parameters used for the quantitative description of these phenomena. Terms related to the up-scaling of photocatalytic processes for industrial applications have been included. This

Glossary should be used together with the “Glossary of Terms used in Photochemistry,” 3rd version, IUPAC Recommendations 2006: as well as with the *IUPAC Compendium of Chemical Terminology*, 2nd edition (the “Gold Book”) because many terms used in photocatalysis are defined in these documents.

Comments by 31 July 2010

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Mülheim/Ruhr, Germany

 www.iupac.org/web/ins/2001-036-1-300

Chemical Speciation of Environmentally Significant Metals with Inorganic Ligands. Part 3: The $\text{Pb}^{2+} + \text{OH}^-$, Cl^- , CO_3^{2-} , SO_4^{2-} , and PO_4^{3-} Systems (IUPAC Technical Report)

Kipton J. Powell, et al

Pure and Applied Chemistry, 2009
Vol. 81, No. 12, pp. 2425–2476

Complex formation between Pb^{II} and the common environmental inorganic ligands, Cl^- , OH^- , CO_3^{2-} , SO_4^{2-} , and PO_4^{3-} , can be significant in natural waters with low concentrations of organic matter. Numerical modeling of the speciation of Pb^{II} among these inorganic ligands requires reliable values for the relevant stability (formation) constants. This paper provides a critical review of such constants and related thermodynamic data.

This review is the third in a series relevant to the speciation of heavy metal ions in environmental waters of low to moderate ionic strength. It provides access to the best available equilibrium data for use in chemical speciation modeling of reactions of Pb^{2+} with the major inorganic ligands present in environmental systems: Cl^- , OH^- , CO_3^{2-} , SO_4^{2-} , and PO_4^{3-} . The previous reviews in this series were on the Hg^{2+} and Cu^{2+} complexation reactions with these ligands.

 <http://dx.doi.org/10.1351/PAC-REP-09-03-05>

Terminology for Reversible-Deactivation Radical Polymerization (IUPAC Recommendations 2010)

Aubrey D. Jenkins, Richard G. Jones, and Graeme Moad

Pure and Applied Chemistry, 2010
Vol. 82, No. 2, pp. 483–491

This document defines terms related to modern methods of radical polymerization, in which certain additives react reversibly with the radicals, thus enabling the reactions to take on much of the character of living polymerizations, even though some termination inevitably takes place. In recent technical literature, these

reactions have often been loosely referred to as, inter alia, “controlled,” “controlled/living,” or “living” polymerizations. The use of these terms is discouraged. The use of “controlled” is permitted as long as the type of control is defined at its first occurrence, but the full name that is recommended for these polymerizations is “reversible-deactivation radical polymerization.”

 <http://dx.doi.org/10.1351/PAC-REP-08-04-03>

Metallomics: Guidelines for Terminology and Critical Evaluation of Analytical Chemistry Approaches (IUPAC Technical Report)

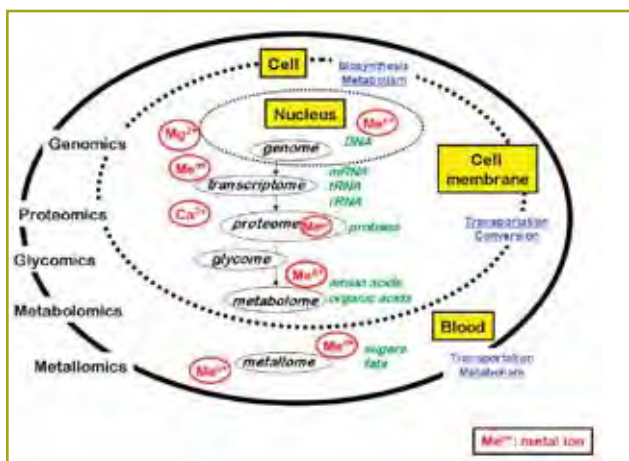
Ryszard Lobinski, et al.

Pure and Applied Chemistry, 2010
Vol. 82, No. 2, pp. 493–504

The knowledge of the complete genetic blueprint of an increasing number of organisms has resulted in efforts aimed at the global analysis and functional study of a particular class of components of a living organism and the emergence of different “-omics.” The concepts of genomics (the study of genes and their function) and proteomics (the study of the set of proteins produced by an organism, their localization, structure, stability, and interaction) have become part of the everyday language of life sciences. Metal ions are a vital component of the chemistry of life. One-third of all proteins is believed to require a metal cofactor, such as copper, iron, zinc, or molybdenum, delivered as a simple or complex ion or a metal-containing compound (e.g., methylcobalamin). The intracellular concentration of several metals, their distribution among the various cell compartments, and their incorporation in metalloproteins are tightly controlled. The understanding of mechanisms by which a metal is sensed, stored, or incorporated as a cofactor requires, in addition to the identification of metalloproteins, the characterization of the pool of nonprotein molecules (products of enzymatic or biochemical reactions) interacting with metal ions or of metabolites of exogenous metallocompounds, such as metallodrugs. A systematic approach to the study of metal content, speciation, localization, and use in biological systems is becoming increasingly important.

The term “metallome” was coined by Williams who referred to it as an element distribution, equilibrium concentrations of free metal ions, or as a free element content in a cellular compartment, cell, or organism. The latter would therefore be characterized not only by its genome or proteome but also by the metallome, their inorganic complement. The meaning of the term “metallome” was then proposed to be extended to the entirety of metal and metalloid species present in a cell or tissue type.

The characterization of the pool of metal-containing species in living organisms and of their interactions with the genome, transcriptome, proteome, and metabolome requires dedicated analytical approaches to in vivo detection, localization, identification, and quantification, in vitro functional analysis, and “in silico” prediction using bioinformatics. The term “metallomics” was coined by Haraguchi to denote the ensemble of research activities related to metals of biological interest (see figure).



Simplified model of biological system and related -omics sciences. The outer area surrounded with the continuous line is showing, e.g., an organ or whole body, and the inner area surrounded with the dotted line is showing a biological cell. Biological fluid, e.g., blood, is circulating in the intermediate area. The Mg^{2+} and Ca^{2+} ions are given as examples because of their large affinities with DNA and proteins, respectively, in the biological cell.

Metallomics has been the topic of a number of reviews, special issues of edited journals and of a Royal Society of Chemistry journal dedicated to the field, *Metallomics*. The terms “metallome” and

“metallomics” have been used in different contexts. In addition, a number of related definitions proliferated, such as, for example, ionomics, heteroatom-tagged proteomics, or elementomics. This report attempts to define the terms “metallome” and “metallomics,” critically evaluates the available relevant analytical methodology, and highlights the concerned disciplines and research areas.

Note: Figure and intro reproduced from PAC; see PAC for full text and references.

<http://dx.doi.org/10.1351/PAC-REP-09-03-04>

Explanatory Dictionary of Key Terms in Toxicology: Part II (IUPAC Recommendations 2010)

Monica Nordberg, John H. Duffus, and Douglas M. Templeton

Pure and Applied Chemistry, 2010
Vol. 82, No. 3, pp. 679–751

The objective of the “Explanatory Dictionary of Key Terms in Toxicology” is to give full explanations of the meaning and usage of toxicological terms chosen for their importance and complexity with regard to the merging of chemistry into toxicology. This requires a full description of the underlying concepts, going beyond a normal dictionary definition. Often, linguistic barriers lead to problems in obtaining a common understanding of terminology at an international level and between disciplines. The explanatory comments should help to break down such barriers. This dictionary is a follow-up and continuation of part I published in 2007 (*Pure and Applied Chemistry* 79(9), 1583–1633, 2007). It consists of a collection of terms chosen from the IUPAC “Glossary of Terms Used in Toxicology.” These terms are organized under 19 main headings. The authors hope that this explanatory dictionary will be helpful to chemists, pharmacologists, toxicologists, risk assessors, regulators, medical practitioners, regulatory authorities, and everyone with an interest in the application of chemistry to solving toxicological problems. It should be of particular value to those involved in risk assessment and management.

<http://dx.doi.org/10.1351/PAC-REC-09-03-01>

Making an imPACT

Name and Symbol of the Element with Atomic Number 112 (IUPAC Recommendations 2010)

K. Tatsumi and J. Corish

Pure and Applied Chemistry, 2010
Vol. 82, No. 3, pp. 753–755

A joint IUPAC/IUPAP Working Party has confirmed the discovery of the element with atomic number 112. In accord with IUPAC procedures, the discoverers proposed a name, copernicium, and symbol, Cn, for the element. The IUPAC Inorganic Chemistry Division Committee recommended this proposal for acceptance, and it has now been approved by the IUPAC Bureau as delegated to act by the IUPAC Council meeting on 12 August 2007 (see March/April 2010 *CI*, p. 16).

 <http://dx.doi.org/10.1351/PAC-REC-09-08-20>

Structure and Property of Polymer/Clay Nanocomposite Materials

S. Venkataramani, J.H. Lee, M.G. Park, and S.C. Kim

Journal of Macromolecular Science, Part A: Pure and Applied Chemistry, 2009
Vol. 46, No. 1, pages 65–73

The aim of this project was to evaluate the structure and properties of the commercialized polymer/clay nanocomposites. The project was carried out by participating members of IUPAC's Polymer Division Subcommittee on Structure and Properties of Commercial Polymers. Two commercialized Nylon/clay samples were received and distributed among the participating laboratories of the subcommittee. The basic structure, such as molecular weight, degree of dispersion of the clay, gallery spacing of the clay, and more were characterized, and the structure was correlated with the properties such as thermal stability, tensile strength, tensile modulus, and elongation at break. The aim was to provide information on these newly developed and commercialized nanocomposite materials to the potential users of these materials. Although the nanocomposite had some exfoliated clay platelets dispersed in the Nylon matrix, it also contained intercalated clay structures. The composition

of these intercalated and exfoliated structures had significant effect on enhancing the modulus and strength properties of the nanocomposite. The basic structure and properties were reported in a publication titled "Structure and Properties of Polyamide-6 & 6/66 /Clay Nanocomposites" authored by S. Venkataramani.

 <http://dx.doi.org/10.1080/10601320802515399>

Rare Earth Metal Chlorides in Water and Aqueous Systems

IUPAC-NIST Solubility Data Series 87

This series presents solubility data for rare earth metal chlorides in water and in ternary and quaternary aqueous systems. The material is divided into three parts: scandium group (Sc, Y, La), light lanthanide (Ce–Eu), and heavy lanthanide (Gd–Lu) chlorides.

- Part 1. Scandium Group (Sc, Y, La): *J. Phys. Chem. Ref. Data* 37, 1765 (2008)
Part 2. Light Lanthanides (Ce–Eu): *J. Phys. Chem. Ref. Data* 38, 441 (2009)
Part 3. Heavy Lanthanides (Gd–Lu): *J. Phys. Chem. Ref. Data* 38, 925 (2009)

Compilations of all available experimental data are introduced for each rare earth metal chloride with a corresponding critical evaluation. Every such evaluation contains a tabulated collection of all solubility results in water, a scheme of the water-rich part of the equilibrium (Y, La, Ln)Cl₃–H₂O phase diagram, solubility equation(s), a selection of suggested solubility data, and a discussion of the multicomponent systems. Because the ternary and quaternary systems were almost never studied more than once, no critical evaluations or systematic comparisons of such data were possible. Only simple chlorides (no complexes) are treated as the input substances in this work. The literature (including a thorough coverage of papers in Chinese and Russian) has been covered through the middle of 2007.

 www.iupac.org/publications/sds/2009/87_abstract.html

Note: SDS Volume 88: "Esters with Water—Revised and Updated," is planned as a four-part series; the first part was recently published <www.iupac.org/web/ins/2007-046-1-500>; see project page for reference.

Bookworm

Science, Technology, and Innovation for Socioeconomic Development

Edited by Sospeter M. Muhongo, Francis P. Gudyanga, Achuo A. Enow, Daniel Nyanganyura
ICSU Regional Office for Africa, 2009
ISBN 978 0 620 45741 5

As part of its outreach activities, the International Council for Science Regional Office for Africa (ICSU ROA) has published a book that showcases the achievements of science and technology in Africa. *Science, Technology, and Innovation for Socioeconomic Development* highlights the continent's contribution

to the development of science and technology in the world.

Africa has a rich history of indigenous knowledge systems that are still unknown to the outside world. It is also true that research activities in Africa have yielded results that remain largely unpublished in international journals. A good example is in medicine where, for centuries, scientific techniques have been deployed

for culturally specific and psychologically significant treatments involving hydro- and thermal therapy, spinal manipulation, quarantine, and bonesetting (orthopaedics).

The book gives an account of modern scientific developments that may contribute significantly to the realization of the objectives of some of the Millennium Development Goals. It brings together, under one cover, research reports from different African scientists and institutions. In addition, it describes African science and technology innovations that are helping to solve some of the chronic developmental and societal challenges facing the continent in the fields of health,

the environment, and energy sustainability. The book comprises eleven chapters organized in four sections representing the disciplines covered: health, ICT and mathematics, the environment, and energy. Following is a sampling of various chapters:

- Ameenah Gurib-Fakim (Mauritius) shows how medicinal plants provide solutions for certain chronic diseases. He advocates the formulation and implementation of biodiversity policies and laws that translate ancestral traditions into modern businesses that will make the continent healthier and keep it prosperous.
- Charles Wambebe, Hadiza Khamofu, Joseph Okogun, Nathan Nasipuri, Karynius Gamaniel, and the late Rev. P.O. Ogunyale (Nigeria) describe the discovery of an African herbal medicine, Niprisan, which, if successful, will save the lives of many people suffering from sickle-cell anemia on the continent.
- Bhanooduth Lalljee and Sunita Facknath (Mauritius) discuss the vulnerability of small island states to the effects of globalization and investigate the main measures (including policies) taken by the government of Mauritius to face the challenges.
- Francis P. Gudyanga, Clement S. Shonhiwa, and Zivai Chiguvare (Zimbabwe) detail the production of biodiesel from nonedible jatropha seeds and the economic importance of this type of energy to the rural community.

This book is innovative in scope and important in its conclusions. The collection of chapters reveals science, technology, and innovation as critical tools for poverty reduction through accelerated socioeconomic development in Africa. It shows the private sector to be an important player in education, research, development, and the commercialization of Africa's natural products, such as traditional medicine and indigenous knowledge. The book is the first in a series of planned volumes of science, technology, and innovation success stories from Africa that will be published by the ICSU Regional Office for Africa.

 www.icsu-africa.org



Bookworm

An Ontology on Property for Physical, Chemical, and Biological Systems

by René Dybkaer

2009, ISBN 978-87-990010-1-9

<http://ontology.iupac.org>

IUPAC has published an electronic version of René Dybkaer's seminal book *An Ontology on Property for Physical, Chemical, and Biological Systems*. This treatise presents the author's analyses and thinking through some 40 years on the theory of laboratory procedures. It is an ontology in the sense of Hegel (i.e., a combination of logic and metaphysics, clarifying and giving coherence to concepts in the laboratory domain from physical, chemical, and biological points of view). The reader is taken on excursions into philosophy and history of science, in preparation of the main tour into metrology and terminology. The text is written with the formidable attention to detail and correctness that characterizes its author. These properties may well turn out to ensure a perhaps small but long lasting readership. This treatise has been reviewed and acclaimed by authorities in analytical chemistry, laboratory medicine, and metrology.

The present second edition of Dybkaer's book that has been e-published by IUPAC includes the progress in formal metrology as laid down in the third edition of the in the 3rd edition of the *International Vocabulary of Metrology (VIM 3): Basic and General Concepts and Associated Terms* (JCGM 200:2008) [see Nov-Dec 2008 *CI*, p. 21; or iupac.org/publications/ci/2008/3006/bw2_vim.html]. It gives a logical and detailed explanation of concepts that are fundamental for understanding measurements, assumptions, and conclusions in metrology. The e-publication of Dybkaer's work is indeed timely since there is a pressing need for a sound foundation for laboratory IT standards, which affect all fields of science, particularly communication within electronic health care information systems and their global connectivity. IUPAC has a worldwide leadership role in communicating clinical laboratory data, together with its partners, the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) and the International Health Terminology Standards Development Organisation that owns the Systematized Nomenclature of Medicine-Clinical Terms (learn more at www.ihtsdo.org).

Stamps International

See also www.iupac.org/publications/ci/indexes/stamps.html

Johann Heller: Pioneer of Clinical Chemistry

The laboratory analysis of blood, urine, and other bodily fluids to quantify the presence of physiologically significant substances constitutes the subject matter of what is indistinctly known as clinical chemistry, clinical biochemistry, or chemical pathology. Despite humble beginnings in the mid-19th century, it is now a mature and sophisticated science and an essential tool in medical diagnosis and the treatment and prevention of many diseases. Interestingly, the International Federation of Clinical Chemistry

and Laboratory Medicine (IFCC), the umbrella organization that looks out for the interests of clinical chemists worldwide, originated from IUPAC in 1952 and eventually became one of its most vibrant and active Associated Organizations.

The stamp illustrated in this note was issued by the Austrian Postal Service on 31 August 1981 to recognize the 11th International Congress on Clinical Chemistry that took place in Vienna at that time. It features a portrait of Johann Florian Heller (1813-1871), a chemist and pioneer of urinalysis, best known for his ring test for the detection of albumin in urine upon addition of concentrated nitric acid. Although Heller was not the first to observe the formation of a precipitate between urinary proteins and nitric acid, he correctly interpreted the result and refined the test, first reported in 1852, exactly 100 years before the founding of the IFCC.



Written by Daniel Rabinovich <drabinov@uncc.edu>.

Bookworm

About the Author

René Dybkær was born in Copenhagen 7 February 1926. He graduated in medicine from the University of Copenhagen in 1951. Apart from some odd jobs in other specialties, he has devoted his professional and still active career to the domain “clinical laboratories.” (*Devoted* here is used in the sense of a devotee, that is, a zealous enthusiast.) As such, Dybkær has initiated,

chaired, participated in, and contributed to a number of professional groups and organizations responsible for the development of laboratory medicine. In particular, he was chair of the Scientific Committee of IFCC; chair of the IUPAC Commission on Nomenclature, Properties and Units, president of the Division of Clinical Chemistry; and president of IFCC.

René Dybkær is one of the leading authorities on terminology. A central theme for his scientific and organizational efforts is the net outcome and presentation of the clinical laboratory work on properties of patients for use in diagnosis and treatment. His seminal publication from 1967, *Quantities and Units in Clinical Chemistry*, coauthored with Kjeld Jørgensen, established standards for written reports on laboratory results, which has markedly influenced daily practice in the Nordic countries and in several other countries as well. Such a systematic approach ensures that information gathered in a laboratory will be correctly transferred to the patients' records in the health information system.



René Dybkær (left) and IUPAC President Nicole Moreau during the IUPAC General Assembly in Glasgow, UK, August 2009.

has even utilized one hobby—philately—as a source of inspiration for a lecture: For the opening address to an international congress in clinical chemistry, he discussed the role of laboratory science as portrayed on stamps (in this issue's “Stamps International” column is a portrait of Johann Heller, a 19th-century pioneer of clinical chemistry—see page 24).

René Dybkær has received many expressions of appreciation from his peers, among others the Henry Wishinsky Distinguished International Service Award from IFCC (1993) for his outstanding contributions to the understanding of metrology in clinical chemistry and the James O. Westgard Quality Award (1998) for his long-lasting, patient, and successful efforts to improve quality and cooperation in clinical chemistry worldwide.

 <http://ontology.iupac.org>

Nomenclature of Inorganic Chemistry in Bulgarian

2009, 412 p., ISBN 978-954-322-330-5

The *Nomenclature of Inorganic Chemistry, IUPAC Recommendations 2005*, the Red Book, is now available in Bulgarian. The Bulgarian translation was performed by Ivan Dukov. The nomenclature was adapted to the Bulgarian language under the editorship of Christo Balarew.

The publication of this book was an initiative of the National Committee of IUPAC, the Bulgarian Academy of Sciences, through which Bulgaria is a member of IUPAC, and the Institute of General and Inorganic

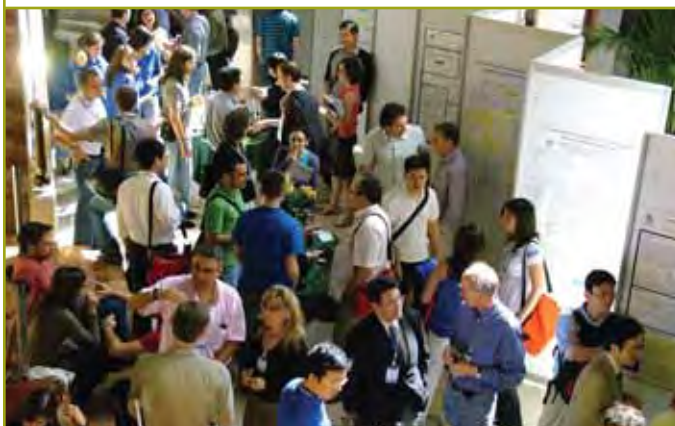
Chemistry. The organization of the project and discussion of adaptation problems were overseen by the National Committee of IUPAC. The adaptation and translation involved significant problems owing to the grammatical differences and the different alphabets of the two languages. These issues were discussed in joint sittings of the editorial board, the translator, and the members of the National Committee of IUPAC. The final edition was approved for publication by the Scientific Council of General and Inorganic Chemistry of the Bulgarian Academy of Sciences. The book was printed by the Academic Publishing House Professor Marin Drinov. Financial assistance was provided by the Research Fund of the Ministry of Education and Science.

Conference Call

Heteroatom Chemistry

by *Enrique Aguilar*

The **9th International Conference on Heteroatom Chemistry** (ICHAC-9) was held in the Auditorio Príncipe Felipe of Oviedo, Spain, from 30 June to 4 July 2009. This series of conferences has become an established international forum for the presentation and discussion of research results on the diverse fields of heteroatom chemistry.



Animated discussions took place during ICHAC-9 coffee-breaks and posters sessions. Photo: Miguel A. Maestro.

Previous ICHAC meetings have been held every three years in different countries: 2007 (Riverside, California, USA); 2004 (Shanghai, China); 2001 (Lodz, Poland); 1998 (London, Ontario, Canada); 1995 (Seoul, Korea); 1992 (Riccione, Italy); 1989 (Albany, New York, USA); and 1987 (Kobe, Japan). For the ninth conference, ICHAC returned to Europe and became a biennial event. Following the tradition of these conferences, ICHAC-9 brought together 210 organic and inorganic chemists from 30 countries to share their interests in heteroatom chemistry, such as applications in synthesis, catalysis, polymers, and materials.

Following welcoming remarks by Prof. Barluenga, the conference commenced with the opening plenary lecture by Prof. Bertrand (Univ. of California, Riverside,

USA) on "Carbenes and Bent-Allenenes in Phosphorus Chemistry." The closing plenary lecture was given by Prof. Lehn (Strasbourg Univ., France) on "Perspectives in Chemistry: From Supramolecular Chemistry towards Adaptive Chemistry." In between, the following plenary lectures were presented:

- Takeshi Akasaka (Tsukuba Univ., Japan), "New Vistas in Fullerene Endohedrals: Functionalization with Compounds from Main Group Elements"
- Matthias Beller (Leibniz Inst. for Catalysis, Germany), "Coupling Reactions with Pd-, Ru- and Cu-catalysts: Mechanism and Industrial Applications"
- Nobuaki Kambe (Osaka Univ., Japan), "Transition Metal Catalyzed Reaction of Alkyl Halides and Organochalcogen Compounds"
- Tien-Yau Luh (National Taiwan Univ., Taiwan), "Alternating Dialkylsilylene-Divinylarene Copolymers"
- Shengming Ma (Shanghai Inst. of Org. Chem. China), "Electrophilic Reactions of Allenes and the Application in Organic Synthesis"
- Nazario Martín (Univ. Complutense de Madrid, Spain), "Organizing Donor-Acceptor Supramolecular Assemblies"
- Robert E. Mulvey (Univ. of Strathclyde, United Kingdom), "Synergic Surprises from Bimetallic Molecules with Alkali Metal-Heteroatom Ligand-Metal Bridges"

In addition, 21 invited lectures and 48 short oral communications were also presented in parallel sessions. Another 68 communications were presented in several structured panel and posters sessions. An award

for the best poster presented was given to the poster entitled "A Novel Aziridination-aza Diels-Alder Cascade Process that Converts Furans into N-substituted 1,2-Dihydropyridines," presented by Manuel Romero Fructos (Univ. de Huelva, Spain).

Overall, the lectures and communications explored the state of the art of heteroatom chemistry as it was analyzed and discussed from many perspectives: heteroatom-bearing compounds as ligands in



Some of the organic chemistry students and post-docs of the Universidad de Oviedo who helped with the organization of ICHAC-9.

Photo: Carlos Valdés.

catalysis, as organocatalysts, as components of polymers and materials, heteroatom-heteroatom bonding, and synthesis of compounds bearing heteroatoms. A collection of 16 papers (based on plenary and invited lectures with the choice of oral contributions) has been published in *Pure and Applied Chemistry* (2010, Vol. 82, Issue 3; iupac.org/publications/pac/82/3).

ICHAC-10 will take place in Kyoto, Japan, sometime during summer 2011. Norihiro Tokitoh will be the conference chair.

Enrique Aguilar <eah@uniovi.es> is a professor of organic chemistry at the Universidad de Oviedo, Spain. He was the secretary of the ICHAC-9 Organizing Committee.

Frontiers in Polymer Science

by *Stanislaw Penczek*

The international symposium **Frontiers in Polymer Science** was held in Congress Centrum Mainz, Germany, from 7–9 June 2009. Organized by Elsevier and sponsored by IUPAC, the symposium celebrated the 50th anniversary of the journal *Polymer*. The symposium attracted 679 participants, including 229 students, from as many as 60 countries.

The opening session began with an address by Rumén Duhlev of Elsevier, Oxford, UK, who discussed the history of *Polymer* and its current. He was followed by IUPAC Bureau Member Stanislaw Penczek, who presented recent IUPAC initiatives and described plans for the International Year of Chemistry and the 100th anniversary of the Nobel Prize in Chemistry awarded to Maria Skłodowska Curie.

Mainz was a fitting location for a meeting on polymer science since it has a vast history of research in this field. The Institute of Organic Chemistry of Mainz University was chaired for a long time by Werner Kern, former collaborator with the Nobel Prize winner Hermann Staudinger, who was the first to show



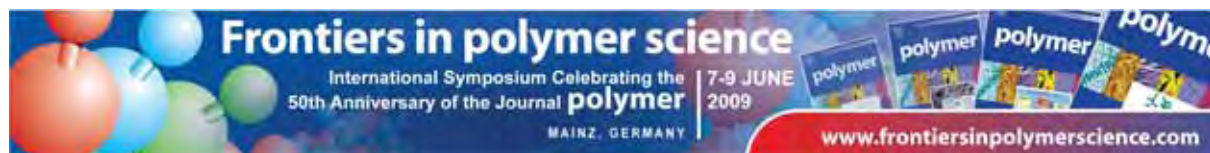
Mainz Cathedral.

that macromolecules/polymers are indeed long chains linked by covalent bonds. Two more prominent scientists worked there as well, Rolf Schulz and Helmut Ringsdorf, who was the first to describe the requirements for the complex bioactive macromolecules—polymeric drugs.

The scientific program of the symposium was organized in such a way that there were only plenary lectures and posters. Thus, there were 15 plenary Lectures and 550 posters. Two plenary lectures, fascinating as always, were given by the Nobel Prize winners Jean-Marie Lehn from France and Alan Heeger from the USA. J.-M. Lehn is further developing the field of supramolecular chemistry he originated more than 20 years ago. He described the formation of dynamers (supramolecular long chain entities) and their possible applications. He showed that two (or more) dynamers in direct contact could exchange large fragments forming noncovalently joined equivalents of block copolymers.

In his lucid presentation, Alan Heeger analyzed the present state of electrically conducting polymers and showed step by step the conditions necessary to be fulfilled in order to construct efficient solar batteries. It is a widely held belief that the only means of solving the demand for world energy needs is through solar energy. Closely related was the lecture by Sir Richard Friend (Cambridge, UK), who developed polymer semiconductors and showed that such devices like light-emitting diodes and transistors can be constructed.

Progress in polymer syntheses in novel areas was presented by Klaus Müllen (stressing the importance of graphene) and Krzysztof Matyjaszewski (USA/Poland), inventor of the most popular method of controlled radical polymerization—ATRP (sometimes incorrectly referred to as “living” polymerization), who showed numerous applications of polymers prepared by ATRP (atom transfer radical polymerization). These applications would not have been possible by any of the earlier known methods of polymer syntheses. Jean



Conference Call



Fréchet (USA), inventor of one of the two known methods of dendrimer syntheses, is focusing on applications in such fields as catalysis and medicine, possible for the first time due to the dendritic structure of macromolecules.

Clément Sanchez (France) focused his presentation on hybrid inorganic-organic materials. Markus Antonietti (Germany) gave an inspiring lecture on carbonization of organic matter. The lecture by

David Tirrell (USA) showed fascinating possibilities at the borderline of molecular biology and polymer chemistry: how by manipulating the genetic material it has been possible to tailor-make polypeptides having desired structures, including polypeptides composed of unnatural amino acid. The first practical success is in ophthalmology, apparently paving the way for construction of “spare” human body parts in this unusual way. The rest of the lectures, no less interesting and important, were closer to polymer physics.

In his address, Rumen Duhlev emphasized the truly international nature of the journal (papers originate from 74 countries while scientists from 100 countries of the world have online access to the journal). He presented data on the citation performance of papers in *Polymer* and stressed that in areas like nanoscience and nanotechnology, conducting polymers, interfaces, membranes, morphology, and electrospinning, *Polymer* attracts the most highly cited papers, on average, than any other competing broad polymer journal.

The symposium was chaired by four prominent scientists: Stephen Z.D. Cheng (University of Akron, USA), Takeji Hashimoto (Japan Atomic Energy Research Agency, Japan), Georg Krausch (Johannes Gutenberg-Universität Mainz, Germany), and Axel H.E. Müller (Universität Bayreuth, Germany).

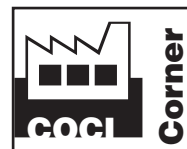
The next meeting in the series will be held 29–31 May 2011 in Lyon, France.

Note: Rumen Duhlev helped prepare this report.

Stanislaw Penczek <spenczek@bilbo.cbmm.lodz.pl> is a professor at the Centre of Molecular and Macromolecular Studies in Lodz, Poland.

The COCI East Asian Regional Workshop

by Akira Ishitani



The second Committee on Chemistry and Industry (COCI) **Workshop on Chemical Industries and IUPAC**, focusing on East Asia, was held on 7–9 April 2009 at the Kanagawa Science Park Hotel in Kawasaki, Kanagawa, Japan. A total of 47 people from 11 countries attended, including IUPAC President Jung-Il Jin, 12 COCI members, 10 prominent speakers from 4 countries—USA, China, Korea, Japan, and China Taipei—including Minjoong Yoon, the president of the Korean Chemical Society and 10 representatives of Company Associates in Japan.

The workshop began with a special invited presentation by A. Fujishima, chairman of the chemistry committee of the Science Council of Japan, the National Adhering Organization to IUPAC. Fujishima is the chairman of KAST, which was one of the supporting organizations for this workshop, and he is one of the leading scientists in Japan. His talk was on photocatalysts that he invented and developed into a successful and innovative technology in Japan. He began with an account of finding the Honda-Fujishima effect, reported in *Nature* in 1972, which involves the decomposition of water into hydrogen and oxygen on the surface of TiO₂ under UV irradiation. He later discovered a second effect, whereby the surface of the coated TiO₂ became strongly wettable under irradiation. The two remarkable effects were combined and used in numerous applications such as air and water purification, surface self-cleaning, and bactericidal applications. Many commercial products were developed from the technology, such as bactericidal walls in hospitals, self cleaning window glass in huge buildings, side mirrors on automobiles, windows on lamps for highway illumination, air filter cleaning, and even agricultural applications such as fertilizer solution recycling. Fujishima also discussed the Photocatalyst Museum located within the Kanagawa Science Park. His talk aroused much interest from the audience.

IUPAC President Jung-Il Jin reviewed the mission and activities of IUPAC for participants. In particular, Jin mentioned the new IUPAC Committee on Chemical Research Funding, where the Samsung IUPAC fund of USD 125 000, is being used for a pilot project in

Conference Call

polymer chemistry. He also discussed plans for the International Year of Chemistry in 2011.

COCI Chair Mark Cesa reviewed the mission and activities of COCI, which strives to generate globally important projects such as the Safety Training Program and Workshops, public appreciation of chemistry, and Responsible Care, and has the responsibility within IUPAC for relations and interactions with Company Associates. He explained the aims of the Kawasaki Workshop, which follows the successful workshop for Western Europe in Marl, Germany, in 2008. The workshops provide a forum for summarizing the present conditions of the regional chemical industries, and for discussing the activities of chemical societies in the East Asia region. The major goal of the workshops is to identify possibilities for strengthening relations between IUPAC and chemical industries.

Shu Zhaoxia, Beijing Economic Technology Institute, SINOPEC, gave an overview of the chemical industry in China, stating that it comprises 7 percent of the total output value of all of Chinese industry. Within the chemical industry, ethylene and its derivatives contribute the majority of chemical output at 75 percent. Both demand and capacity growth in China are several times greater than the world average, she said.



Group photo from the second COCI Workshop on Chemical Industries and IUPAC, 7-9 April 2009 in Kawasaki, Kanagawa, Japan.

Jinliang Qiao, Vice-President, Beijing Chemical Engineering Institute, SINOPEC, talked about the current state of chemical research in China. He described 1978 as “spring time” for science in China, since a year later China experienced uninterrupted research progress for 30 years. By 2005, he stated, China published around 140 000 papers, which were 13.2 percent of the world total and in third place overall, with a 112 percent increase over 2001. In the 1980s industrial research bridged business and academia, but by the 1990s industrial R&D shifted to a shorter-term focus, thus creating a gap as universities focused on basic

Recent Outreach

In 2010, COCI is continuing to reach out to industry and exchanging ideas. Thus, an interesting and successful panel discussion on “Activities and Research Developments in Kuwait Industry” was held in conjunction with the Kuwait Conference on Chemistry in Kuwait City on 9 March 2010. The event was held a day prior to the COCI annual meeting, and at the same location, allowing attendees to join both events. The panel discussion was organized by Titular Member Khalida Al-Dalama under the auspices of the Kuwait Chemical Society. In addition to a presentation by Colin Humphris on COCI activities, there were multiple contributions from Kuwait industries.

research. Qiao noted that it is very important to fill the gap between basic research and commercialization to allow for smooth technology transfer from universities to industry.

The petrochemical industry in Korea was the focus of a talk by Chan-Hyun Choi, senior vice president of R&D at Samsung Total Petrochemical Co., Ltd. He said that the history of the Korean chemical industry shows that the period 1972 to 1990 was the take-off stage, 1990 to 1997 the growth stage, 1997 to 2001 a restructuring stage, from 2002 to 2008 a boom stage, and from 2008 on it probably will be in a restructuring stage again. Korean petrochemical products are mostly exported to China and Asian countries. Most of the technologies being used are licensed from abroad, he noted. R&D is being done separately by companies with very little collaboration between industry and universities. Choi stated that the Korean chemical industry needs restructuring by mergers and acquisitions with a focus on more high value added products used in IT, NT and ET. As for collaboration with IUPAC, Samsung has supported the Young Polymer Scientist Award since 2003, and has donated USD 125 000 for polymer chemistry projects. Choi suggested that IUPAC hold miniconferences on special topics such as environmental issues and specialty polymers.

Korean Chemical Society President Minjoong Yoon of Chungnam National University provided an overview of his organization, which celebrated its 60th anniversary in 2006, the National Year of Chemistry in Korea. The KCS has over 6000 members and an annual budget of USD 1.3 million. It publishes two academic journals, two magazines, monographs and educational materials. It gives the KCS Award, organizes and holds international and domestic confer-

Conference Call

ences, meetings and seminars, and provides activities for chemical education.

Taiwan's chemical industries have generated sales amounting to 30 percent of the total from Taiwanese manufacturing industries, according to workshop speaker Jonq-Min Liu, general director of the Material and Chemical Research Laboratories, Industrial Technology Research. He noted that Taiwan's chemical industrial growth has been around 10 percent every year since 2004 until the world financial crisis hit, when growth rates slowed to 2.4 percent. Production in 2008 was valued USD 120 billion, and the industry employed 430 000 people.

Tetsuo Nishide, executive director of the Japanese Chemical Industries Association, gave a status report on the industry in Japan and described what his organization does. According to Nishide, shipments of chemical products from Japan are third in the world. A comparison of the chemical industries in Japan with overall Japanese manufacturing shows that the chemical industry contributes 13 percent of all shipments, 15.6 percent of value added, 11.1 percent of total employees, and 20 percent of R&D. He noted that the JCIA, established in 1948, has 182 company members and 75 associate members.

Activities of the Chemical Society of Japan were the subject of a talk by Teruto Ohta, secretary general of CSJ. Founded in 1878, CSJ is now the fifth largest such organization in the world, said Ohta. It has over 30 000 members, 37 staff, and an annual budget of approximately USD 10 million. Annual meetings gather over 9000 participants and 6000 papers. The CSJ has close relations with many international organizations like IUPAC, FACS, C6 and C3, and it organizes PACIFICHEM, which draws over 11 000 participants from 64 countries.

After the presentations, a general discussion followed with the subject of identifying possible activities COCI and IUPAC could undertake that would benefit chemists and chemical industries in the East Asian region. A few of the major themes in the presentations and discussions involved concerns over the academic-industry research and development gap; the need for increasing public appreciation of chemistry and recruitment of the best students to chemistry; participation in activities of the International Year of Chemistry; and the importance of chemical expertise to economic competitiveness in the region. The differences between the chemical economies of the East

Asian countries were well noted by the attendees. Several new activities were suggested by the attendees following on the themes discussed in the presentations. Suggestions included internships at East Asian Company Associates for students and industrial scientists from other regions; technology transfer success stories; life cycle analysis; and awards for industrial chemistry. These are being considered by COCI.

Many attendees reported that the workshop provided a valuable forum for sharing information and building contacts that may result in future collaborations. It was noted by COCI members that many of the issues raised at this workshop were the same as ones raised at the Western European Workshop held in 2008. It was suggested that this workshop could be used as a model for workshops in other regions. Possibilities for future workshops include the Middle East, Eastern Europe, and Latin America.

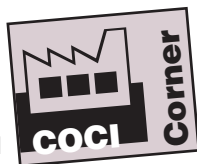
IUPAC and COCI note with gratitude the generous financial support for the Workshop provided by the organizers and the Japanese Company Associates, particularly for the local arrangements such as the lodging, meals, receptions, and tours for guests. In addition, the efforts of the speakers who volunteered to attend and participate are particularly acknowledged. The COCI East Asia Workshop was very productive, and further workshops in other regions are planned for the coming years.

The Workshop was supported by IUPAC, the Chemical Society of Japan, Science Council of Japan, and the Kanagawa Academy of Science and Technology. Financial support was provided by IUPAC, COCI and the Japanese Company Associates. The workshop was organized by a task group led by COCI Titular Member Akira Ishitani, with assistance from Mark Cesa, COCI chair, Michael Booth, COCI secretary and treasurer, and Michael Droescher, associate member. In addition, a local organizing committee led by Ishitani provided local arrangements.

Note: Mark Cesa and Michael Droescher contributed to this report.

Akira Ishitani <ishitani@newkast.or.jp> is from the Kanagawa Academy of Science and Technology, Kanagawa, Japan. Until 2009, he was an active member of COCI, representing Japan and its Company Associates. Japan has the largest industrial representation in IUPAC.

 iupac.org/web/ins/2008-038-1-022



Conference Call

MacroMolecular Complexes

The **13th IUPAC International Symposium on MacroMolecular Complexes (MMC-13)** took place 15–17 November 2009 in Concepción, Chile.

The symposium, and the many fruitful discussions during breaks and social activities, brought together researchers involved in macromolecular complexes, polymer-metal complexes, supramolecular chemistry; students; distinguished scientists; and newcomers to macromolecular complexes science. There were 11 plenary and invited lectures together with regular oral contributions.

The forum focused on the following areas:

- Macromolecule-Metal Complexes
- Polynuclear Complexes
- Capped Metal Nanoparticles
- Organic-Inorganic Hybrids
- Self-Assembly and Supramolecular Complexes
- Polyelectrolytes
- Conductivity Properties
- Photophysical Functions
- Catalysis and Photocatalysis
- Functions and Applications (Electronic, Optical, Magnetic)
- Biological Applications

There were 79 participants, presenting some 73 contributions. Many students, who comprised about

25 percent of participants, attended the presentations, and 22 presented their own results. It is not at all the intention of MMC-13 to have a high number of participants and parallel sessions but rather to attract young scientists and advanced and graduate students to give them the opportunity to meet with colleagues and well-known scientists to exchange experiences, make contacts, and present their results to the scientific community.



Group photo of participants at the 13th MMC-13 Symposium, 15–17 November 2009, Concepción, Chile.

The symposium was organized by Bernabé L. Rivas, chair, and the

cochairs M. Angélica del Valle, Juan Costamagna, and Raul Quijada.

The biannual MMC-13 Symposia has been IUPAC-sponsored for several years. The following posters received IUPAC awards:

- “Effect of Poly(Tetrabromo-P-Phenylenediselenide) as “Buffer Layer” in Thin Film on Heterojunction Solar Cells Performances,” A. Godoy, L.Cattin, J.C.Bernède, F.R. Díaz., M.A. del Valle
- “Electropolymerized Poly(Tripyridinio Mesitylene): Its Electrochemical Property and Complexation with Anionic Porphyrins N. Sano, I. Moreno-Villoslada, K. Oyaizu, and H. Nishide.

The president of the selection committee was Kurt E. Geckeler, a representative of IUPAC.

Visas

It is a condition of sponsorships that organizers of meetings under the auspices of IUPAC, in considering 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 irrespective of race, religion, or political philosophy. IUPAC sponsorship implies that entry visas will be granted to all bona fide chemists provided application 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.

How to Apply for IUPAC Sponsorship

Conference organizers are invited to complete an Application for IUPAC Sponsorship (AIS) preferably 2 years and at least 12 months before the conference. Further information on granting sponsorship is included in the AIS and is available upon request from the IUPAC Secretariat or online.

 www.iupac.org

Where 2B & Y

Polymer Science and Technology

24-29 October 2010, Hersonissos, Greece

The **8th Greek Polymer Society Symposium on Polymer Science and Technology**, which will honor Professor Nikos Hadjichristidis, will be held in Hersonissos, Crete, at the Creta Maris Hotel, from 24-29 October 2010.

This international symposium:

- takes place every two years
- is the most important scientific event in the field of polymer science in Greece
- has more than 85 scientists, all highly recognized in the field, as invited lecturers
- hosts all research teams from Greek universities and research institutes

The aims of the conference include the following:

- presenting and disseminating recent advances in polymer science and technology, including polymer synthesis and characterization; polymer properties and applications; study of the self-assembly behavior in solution and in bulk; properties of biopolymers, colloids, composites, and nanocomposites; modification of surfaces and interphases; polymer theory; and simulations
- promoting cooperation and advancement of research and development of polymer science and technology

- bringing together a wide range of polymer scientists, researchers, engineers, and students from all over the world
- publicizing the international contributions of the Greek polymer community to the area of polymer science and technology

This symposium will be an international forum for in-depth assessment of the challenges involved in the dynamic and fast-moving field of polymer science research. For more details and to register, visit the conference website. Abstracts for consideration as poster presentations can be submitted online by 30 June 2010. All submitted abstracts received will be reviewed on the basis of scientific merit and novelty.

Join us in Crete to explore a plethora of current research topics in polymer science and to network with fellow academics and industrial researchers.

See **Mark Your Calendar** on page 35 for contact information.

 www.mitos.com.gr/conferences/hadjichristidis



Chemistry in Africa

20-23 November 2010, Luxor, Egypt

The **11th International Chemistry Conference and Exhibition (11th ICCA)** will be held from 20-23 November 2010 in Luxor, Egypt. Organized by the Chemistry Department, Faculty of Science, Sohag University, and the African Association of Pure and Applied Chemistry, the conference is expected to attract more than 250 scientists to in this important event in Africa.



The theme of this 11th ICCA is "The Role of Chemistry in the Development of Africa." The conference will comprise poster and oral presentations with prominent scientists who will present their experiences and ideas as they relate to this theme.

There will be ample opportunity for attendees to visit one of the most important ancient historical sites in the world <www.Luxorguide.com>.

See **Mark Your Calendar** on page 35 for contact information.

 www.sohag-univ.edu.eg/conf11icca

3rd EuCheMS Chemistry Congress

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29.08. – 02.09.2010 · NÜRNBERG · GERMANY

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Chairmen

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Swiss Federal Institute of Technology Zurich/CH
Andreas Hirsch
University Erlangen-Nürnberg/DE



www.euchems-congress2010.org

EuCheMS, the European Association for Chemical and Molecular Sciences incorporates 50 member societies which in total represent some 150.000 individual chemists in academia, industry and government in over 35 countries across Europe.

Contact: Gesellschaft Deutscher Chemiker e.V. · Congress Team · P.O. Box 90 04 40 · 60444 Frankfurt am Main · Germany
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Upcoming IUPAC-sponsored events
See also <http://www.iupac.org/indexes/Conferences>
for links to specific event websites

2010 (later than 1 July)

 *IUPAC poster prizes to be awarded*

4–8 July 2010 • Pesticide Chemistry • Melbourne, Australia 

12th IUPAC International Congress of Pesticide Chemistry

Dr. Elizabeth Gibson, RACI, 1/21 Vale Street, North Melbourne, VIC 3051, Australia

Tel.: +61 0 3 9328 2033, Fax: +61 0 3 9328 2670, E-mail: elizabeth@raci.org.au

5–8 July 2010 • Polymer-Solvent Complexes • Strasbourg, France

8th International Conference on Polymer-Solvent Complexes and Intercalates

Prof. Jean-Michel Guenet, Université de Strasbourg, Institut Charles Sadron—CNRS, 23, Rue de Loess

F-67034 Strasbourg, Tel.: + 33 038 841 4087, Fax: + 33 038 841 4099, E-mail: guenet@ics.u-strasbg.fr

11–15 July 2010 • Phosphorus • Wrocław, Poland

18th International Conference on Phosphorus Chemistry

Prof. Paweł Kafarski, Department of Bioorganic Chemistry, Faculty of Chemistry, Wrocław University of

Technology, Wybrzeże Wyspińskiego 27, 50-370 Wrocław, Poland

E-mail: pawel.kafarski@pwr.wroc.pl

11–16 July 2010 • Macromolecules • Glasgow, UK 

43rd International Symposium on Macromolecules—IUPAC World Polymer Congress (Macro 2010)

Prof. Peter A. Lovell, School of Materials, The University of Manchester, Grosvenor St. Manchester, M1 7HS, UK

Tel.: +44 (0) 161-306-3568, Fax: +44 (0) 161-306-3586, E-mail: pete.lovell@manchester.ac.uk

11–16 July 2010 • Photochemistry • Ferrara, Italy 

XXIII IUPAC Symposium on Photochemistry

Prof. Franco Scandola, Dipartimento di Chimica, Università di Ferrara, Via L. Borsari 46, I-44100 Ferrara, Italy

Tel.: +39 05 32 455 160, Fax: +39 05 32 240 709, E-mail: snf@unife.it

18–22 July • Prague, Czech Republic • Macromolecules

74th Prague Meeting on Macromolecules: Contemporary Ways to Tailor-Made Polymers

Dr. Eva Grisová, PMM Secretariat, Academy of Sciences of the Czech Republic, Institute of Macromolecular Chemistry, Heyrovský Sq. 2, CZ-162 06 Praha 6

Tel.: +420 296 809 250, Fax: +420 296 809 410, E-mail: sympo@imc.cas.cz

25–30 July 2010 • Solubility Phenomena • Leoben, Austria 

14th International Symposium on Solubility Phenomena and Related Equilibrium Processes

Prof. Heinz Gamsjäger, Montanuniversität Leoben, Lehrstuhl für Physikalische Chemie,

Franz Josef Strasse 18, A-8700 Leoben, Austria

Tel.: +43 (0) 3842 402 4804, Fax: +43 (0) 3842 402 4802, E-mail: heinz.gamsjaeger@mu-leoben.at

25–30 July 2010 • Coordination Chemistry • Adelaide, Australia

39th International Conference on Coordination Chemistry

Dr. Christopher Sumby, University of Adelaide, School of Chemistry & Physics, Adelaide, SA 5005, Australia

Tel.: +61 8 8303 7406, Fax: +61 8 8303 4358, E-mail: christopher.sumby@adelaide.edu.au

1–6 August 2010 • Chemical Thermodynamics • Tsukuba, Japan 

21st International Conference on Chemical Thermodynamics

Prof. Kazuya Saito, Department of Chemistry, Graduate School of Pure and Applied Sciences, University of

Tsukuba, Tsukuba, Ibaraki 305-8571, Japan

Tel.: +81 29 853 4239, Fax: +81 29 853 6503, E-mail: kazuya@chem.tsubuka.ac.jp

1–6 August 2010 • Organic Synthesis • Bergen, Norway 

18th International Conference on Organic Synthesis

Prof. Leiv K. Sydnes, Department of Chemistry, University of Bergen, Allégaten 41, N-5007 Bergen, Norway

Tel.: +47 55 58 34 50, Fax: +47 55 58 94 90, E-mail: leiv.sydnes@kj.uib.no

1–6 August 2010 • Carbohydrate • Chiba, Japan

25th International Carbohydrate Symposium

Prof. Yukishige Ito, RIKEN Advanced Science Institute, 2-1 Hirosawa, Wako, Saitama 351-0198, Japan

Tel.: + 81 48-467-9430, Fax: + 81 48-462-4680, E-mail: yukito@riken.jp

8–13 August 2010 • Chemical Education • Taipei, Taiwan 

21st International Conference on Chemical Education—Chemistry Education and Sustainability in the Global Age
Prof. Mei-Hung Chiu, National Taiwan Normal University, No. 88, Ding-Zhou Road, Section 4, Taipei, 116, Taiwan
Tel.: + 886 2-2932-2756, Fax: + 886 2-2935-6134, E-mail: mhc@ntnu.edu.tw

15–19 August 2010 • Green Chemistry • Ottawa, Canada 

3rd IUPAC Conference on Green Chemistry (ICGC-3)
Prof. Philip Jessop, Department of Chemistry, Queen's University, 90 Bader Lane, Kingston, ON, K7L 3N6, Canada
Tel.: +1 613-533-3212, Fax: +1 613-533-6669, E-mail: info@icgc2010.ca

15–20 August 2010 • Supramolecular Architectures and Materials • Montego Bay, Jamaica

5th International Symposium on Macro- and Supra-molecular Architectures and Materials
Professor Ishenkumba A. Kahwa, Faculty of Pure and Applied Sciences, University of the West Indies, Mona Campus, Kingston 7, Jamaica, Tel.: +1 876 927 1910, Fax: +1 876 805 5580, E-mail: MAM-10@uwimona.edu.jm

22–27 August 2010 • Physical Organic Chemistry • Busan, Korea 

20th International Conference on Physical Organic Chemistry
Prof. Dae-Dong Sung, Department of Chemistry, Dong-A University, Saha-Gu, Busan 604-714, Korea
Tel.: +82 51 200 7243, Fax: +82 51 200 7259, E-mail: ddsung@dau.ac.kr

13–17 September 2010 • Hyperfine Interactions and Nuclear Quadrupole Interactions • CERN, Switzerland

Joint International Conference on Hyperfine Interactions and Symposium on Nuclear Quadrupole Interactions
Professor Reiner Vianden, Universität Bonn, Helmholtz Institute für Stahlen und Kerphysik (HISKP), Nussallee 14-16, D-53115 Bonn, Germany, Tel.: +49 228 733 355, Fax: +49 228 732 505, E-mail: vianden@hiskp.uni-bonn.de

14–18 September 2010 • Biotechnology • Rimini, Italy 

14th International Biotechnology Symposium and Exhibition
Prof. Fabio Fava, Università di Bologna, Via Terracini, 28, I-40131 Bologna, Italy
Tel.: +39 051 209 0330, Fax: +39 051 209 0348, E-mail: fabio.fava@unibo.it

19–23 September 2010 • Heavy Metals in the Environment • Gdansk, Poland

15th International Conference on Heavy Metals in the Environment
Prof. Jacek Namiesnik, Department of Analytical Chemistry, Gdansk University of Technology, G. Narutowicza 11/12, PL-80 233 Gdansk, Poland, Tel.: +48 58 347 1345, Fax: +48 58 347 2340, E-mail: chemanal@pg.gda.pl

20–23 September 2010 • Polymer Behavior • Lodz, Poland

4th International Conference on Polymer Behavior
Professor Andrzej Galeski, Centre of Molecular & Macromolecular Studies, Polish Academy of Sciences, PL-90 363 Łódź, Poland, Tel.: + 48 426 803 250, Fax: +48 426 803 261, E-mail: andgal@cbmm.lodz.pl

6–9 October 2010 • Vanadium • Toyama, Japan

7th International Symposium on the Chemistry and Biological Chemistry of Vanadium
Tatsuya Ueki, Department of Biological Science, Hiroshima University, Higashi-Hiroshima, Hiroshima 739-8526, Japan
Tel.: +81 82 424 7437, Fax: +81 82 424 7437, E-mail: secretariat@vanadiumseven.com

6–10 October 2010 • Eurasia Chemistry • Amman, Jordan

11th Eurasia Conference on Chemical Sciences
Dr. Amal Al-Aboudi, Chemistry Department, University of Jordan, Amman 11942, Jordan
Tel.: +962 6 535 5000, Fax: +962 6 535 5522, E-mail: alaboudi@ju.edu.jo

11–14 October 2010 • Novel Materials • Wuhan, China

6th International Symposium on Novel Materials and their Synthesis
Prof. Yu-Ping Wu, Department of Chemistry, Fudan University, No. 220 Handan Road, Shanghai 200433, China
Tel.: +86-21-6564-2141 +86-21-5566-4223, Fax: +86-21-5566-4223, E-mail: nms@fudan.edu.cn

24–29 October 2010 • Polymer Science • Hersonissos, Greece

8th Hellenic Society Symposium on Polymer Science and Technology
Professor Marinos Pitsikalis, Department of Chemistry, University of Athens, Panepistimiopolis, Zografou, GR-15771, Greece, Tel.: +30 210 727 4440, Fax: +30 210 722 1800, E-mail: pitsikalis@chem.uoa.gr

20–23 November 2010 • Chemistry in Africa • Luxor, Egypt

11th International Chemistry Conference in Africa
Professor Ahmed El-Saghier, University of Sohag, Department of Chemistry, Sohag, 82542 Egypt
Tel.: +20 128 307 176, Fax: +20 934 601 159, E-mail: africaconf2010@yahoo.com

Conference Call

2011

 IUPAC poster prizes to be awarded

16-21 January 2011 • African Chemical Societies • Johannesburg, South Africa

40th South African Chemical Society Convention & 3rd Federation of African Chemical Societies Meeting

Prof. James Darkwa, University of Johannesburg, Department of Chemistry, Auckland Park 2006, South Africa

Tel.: +27 11 559 2838, Fax: +27 11 489 2819, E-mail: jdarkwa@uj.ac.za

22-26 May 2011 • Analytical Sciences • Kyoto, Japan

IUPAC International Congress on Analytical Sciences 2011 (ICAS-2011)

Prof. Koji Otsuka, Department of Material Chemistry, Graduate School of Engineering, Kyoto University
Katsura, Nishikyo-ku, Kyoto 615-8510, Japan

Tel.: +81 75-383-2447, Fax: +81 75-383-2450, E-mail: otsuka@anchem.mc.kyoto-u.ac.jp

23-27 May 2011 • Advanced Materials • Pretoria, South Africa

11th International Conference on Frontiers of Polymers and Advanced Materials

Prof. Walter W. Focke, University of Pretoria, Department of Chemical Engineering, Menlo Park, Pretoria 0102,
South Africa, Tel.: +27 21 12 420 3728, Fax: +27 21 12 420 2516, E-mail: walter.focke@up.ac.za

10-14 July 2011 • Biodiversity and Natural Products • Brisbane, Australia

*7th International Conference on Biodiversity & 27th International Symposium on the
Chemistry of Natural Products*

Prof. Mary J. Garson, School of Chemistry & Molecular Biosciences, University of Queensland, Chemistry
Building, Room 307, Brisbane, QLD 4072, Australia,

Tel.: +61 7 3365 3605, Fax: +61 7 3365 4273, E-mail: m.garson@uq.edu.au

30 July-7 August 2011 • 43rd IUPAC Congress • San Juan, Puerto Rico

Chemistry Bridging Innovation Among the Americas and the World

Gabriel A. Infante, Pontifical Catholic University of Puerto Rico

E-mail: ginfante@iupac2011.org, www.iupac2011.org



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2010 Thieme–IUPAC Prize in Synthetic Organic Chemistry



Phil S. Baran



We are pleased to announce that the 2010 Thieme–IUPAC Prize has been awarded to Phil S. Baran of the Scripps Research Institute. Professor Baran becomes the 10th recipient of the prize, and joins a select group of scientists under the age of 40 years whose research has had a major impact on the field of synthetic organic chemistry. The prize, which is presented every two years and includes an award of € 5000, will be given to Phil Baran at the Thieme–IUPAC lecture on August 3, 2010, at the ICOS-18 conference in Bergen, Norway.

After completing a B.S. in Chemistry at New York University during which he carried out research with David Schuster, Phil Baran undertook Ph.D. studies at the Scripps Research Institute under the supervision of K.C. Nicolaou. He then moved to Harvard University for two years of postdoctoral study with E.J. Corey, before returning to the Scripps Institute in 2003 to begin his independent career as an Assistant Professor. Promotion to full Professor followed in 2008.

Phil Baran's research is focused on the discovery and invention of useful chemistry in the course of the design and execution of efficient total syntheses of complex natural products. His approach, characterized by imaginative planning of synthetic routes, with minimal use of protecting groups and redox transformations, has met with remarkable success. To date, Baran's group has completed the syntheses of members of over 15 classes of highly complex and biologically active natural products. Notable examples include welwitindolinone A and fischerindoles I and G (assembled in just 7–9 steps from commercial material, protecting group free), psychotrimine (5 steps, one protecting

group), kapakahines B and F (12–14 steps, two protecting group manipulations), and sceptrin (12 steps, one protecting group). The total syntheses of some of the most challenging alkaloid structures known have been achieved by the Baran group: avrainvillamide and the stephacidins, the massadines, the complex terpene vinigrol, and, most recently, palau'amine, a target for some of the best synthetic groups for several years.

Mechanistic insight and reaction design are distinguishing components of Phil Baran's research. He has made fundamental additions to synthetic methodology in the context of intermolecular enolate coupling with iron and copper salts and the development of directed CH-oxidation reactions using carbamates. He has also made noteworthy contributions to the elucidation of biosynthetic pathways for a number of the molecules whose synthesis he has studied.

To summarize, while still at a very early state in his career, Phil Baran has set new benchmarks for brevity and efficiency in the total synthesis of a variety of classes of molecules and, in so doing, has set a new paradigm in the pursuit and achievement of protecting-group-free synthesis. His commitment to fundamental methodological developments, perceptive analysis of the challenges posed by the synthesis of complex molecules, and bold execution of his plans serve as an inspiration to the synthetic organic community and reaffirm the excitement and significance of the science of organic chemistry.

We congratulate Phil Baran and look forward to hearing the latest exciting developments from his laboratories, an Account of which will be published in *SYNLETT*, at his award lecture in Bergen, Norway.



Phil S. Baran

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