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Strategic Planning for a New East Asian Network for Organic Chemistry

Since October 2005, an IUPAC project has been laying the groundwork for the establishment of an East and South East Asian Network for Organic Chemistry. It has been estimated that 30 percent of the research done in the field of organic chemistry in the world is being produced in Asia. While this statistic is encouraging, a careful inspection shows that productive research is presently concentrated in a few countries in the region, and is by no means a common phenomenon across all countries in Asia.

The Japan Society for the Promotion of Science's Asian CORE program has been designed to create world-class research hubs, "core institutions within the Asian region," in selected cutting-edge fields with topics deemed to be of high international importance, while fostering the next generation of leading researchers by establishing sustainable collaborative relations among members in seven countries/regions. The activities of the program involve scientific conferences, researcher exchanges, lectureship tours, and joint research.

The purpose of the IUPAC project (# 2005-039-2-300) is to plan the best strategy to link with the JSPS program and establish a cooperative network that will provide maximum support for organic chemists throughout the East Asian region. The proposed network would be expected to promote collaborative research work based on interactive relationships, academic exchanges, and activities. The network would be responsible for the organization of workshops on aspects of organic chemistry, chemical techniques, and current research trends, with the aim of enhancing the level of organic chemistry and research in less developed Asian countries.

A recent example of the cooperative network in action was the 2nd International Conference on Cutting-Edge Organic Chemistry in Asia, held 2–6 September 2007 in Busan, Korea. The 138 organic chemists who participated were from the 7 member regions/countries.

Prior to the conference, about 40 organic chemists attended the second workshop under the IUPAC project. IUPAC supported the lecturers as well as the organic chemists whose home countries were not part of the Asian CORE program and attendees from countries that are not National Adhering Organizations of IUPAC, such as the Philippines and Malaysia. The workshop featured two speakers who delivered lectures and gave demonstrations to update attendees on new techniques Takao Ikariya of the Tokyo Institute of Technology spoke on "Applications of Supercritical Fluids in Organic Chemistry," and Kong Hung Sze from the University of Hong Kong delivered a talk on "Application of New NMR techniques in Organic Chemistry." The workshop was recorded on video for possible use at future workshops. Extensive notes were also made available.

Group photo at the 2nd International Conference on Cutting-Edge Organic Chemistry in Asia.

The 3rd International Conference on Cutting-Edge Organic Chemistry in Asia (ICCEOCA-3) will be held 19–23 October 2008 in Hangzhou, China, This will be followed by ICCEOCA-4 in Bangkok (2009) and ICCEOCA-5 in Taipei (2010).

For more information and comments, contact Task Group Chair Minoru Isobe <isobem@ff.iij4u.or.jp>.

www.iupac.org/web/ins/2005-039-2-300

Critically Evaluated Techniques for Size Separation Characterization of Starch

A better understanding of structure-property relations for starch is needed to address human and animal nutritional needs and industrial applications such as paper manufacture. Characterizing the structure is complex because one of the two types of starch in grains, amylopectin, is hyperbranched and of very high molecular weight.

Size separation techniques (size-exclusion chromatography, field-flow fractionation), with multiple detection, in principle provide powerful tools for obtaining data that are sensitive to this complex structure. However, reliable application of these methods is bedeviled by two problems: (1) not all the starch may be dissolved, and (2) shear scission may occur

during separation. Recognizing these problems, several leading researchers in the field over the last few years have independently devised various protocols, typically involving the use of solvents (eluents) such as dimethyl sulfoxide of varying degrees of dryness, with or without other additives such as dimethylacetamide and LiBr, various dissolution regimens, and various flow techniques. However, there has been no comparison of the data obtained from different set-ups.

This project will bring together these leading groups to discuss the full technical details of their different procedures, including the reasons for these being chosen by the particular group, and perceived problems with these various methods. The main objective of this project is to produce a reliable means of characterizing starch by size separation techniques (such as size exclusion chromatography and field-flow fractionation), by critically examining and reconciling the various, and presently rather diverse, existing methodologies. A round-robin will then be organized to characterize the same sample by the varying techniques. The results will be used to develop improved techniques that can be used by researchers worldwide to obtain reliable and reproducible results.

For more information and comments, contact Task Group Chair Robert G. Gilbert <b.gilbert@uq.edu.au>.

www.iupac.org/web/ins/2007-058-1-400

Biophysico-Chemical Processes of Anthropogenic Organic Compounds in Environmental Systems

Anthropogenic organic compounds (AOCs) are synthetically made organic chemicals. They range from gasoline components (e.g., benzene, toluene, xylene) to emerging contaminants such as endocrine disrupting chemicals and personal care products. Due to their wide use and disposal, AOCs are commonly found in our environment, such as in water we drink, air we breathe, and soil from which we get our food. These compounds are often toxic and can severely deteriorate an ecosystem. They can also bioaccumulate through food chains and cause various diseases (and even death) to organisms including humans. AOCs behave differently in various environmental media which differ in their different physical, chemical, and biological components and processes. Therefore, an in-depth and more complete understanding of the biophysico-chemical processes of AOCs in environmental systems is essential for the development of innovative management strategies for sustaining the environment and ecosystem integrity.

Physical, chemical, and biological, interfacial interactions and processes govern the fate, transport, availability, exposure, and risk of AOCs. However, the fundamentals of many physicochemical and biological interfacial reactions of AOCs and their impacts on ecosystems largely remain unknown. As a result, predictive models for their fate, transport, and risk in different media are often off target. To advance the frontiers of knowledge on the subject matter, it would require a concerted effort of scientists in relevant physical and life sciences such as chemistry, mineralogy, geochemistry, microbiology, ecology, and soil, atmospheric, and aquatic sciences.

In contrast to the classical books which largely focus on separate, individual physicochemical and biological aspects, this proposed book aims to integrate the frontiers of knowledge on the fundamentals and the impact of physicochemical and biological interactions and processes of AOCs in soil, sediment, water, and air. The specific objectives of this proposed book are to address: (1) fundamental biophysico-chemical processes of AOCs in the environment, (2) occurrence and distribution of AOCs in air, water, and soil, and their global cycling, (3) the state-of-the-art analytical techniques of AOCs, and (4) the restoration of natural environments contaminated by AOCs. The proposed book will also identify the gaps in knowledge on the subject matter and as such provide future directions to stimulate scientific research to advance the chemical science on biophysico-chemical interfacial reactions in natural habitats.

This book would achieve this goal by bringing together world-renowned international scientists on the subject matter to integrate the current state-of-the-art, especially the latest discoveries, development, and future prospects on the research of AOCs in the environment. Thus, this book will be an important addition to the scientific literature and a valuable source of reference for students, professors, scientists, and engineers. The book will be co-edited by Baoshan Xing, Nicola Senesi, and P. Ming Huang, and published as volume 3 in the IUPAC book series titled *Biophysico-Chemical Processes in Environmental Systems*.

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www.iupac.org/web/ins/2008-001-1-600