

Division III. Organic and Biomolecular Chemistry

Annual Report 2000/2001

Summary

Organic Chemistry has become a very broad topic ranging from organic reactions and synthesis to structural and functional aspects of organic compounds with physical and biological implications. Interdisciplinary aspects have become increasingly important, which is also reflected in recent actions of the Division. Thus, the Division has initiated several interdisciplinary projects within the new project based system in which IUPAC now is operating. Furthermore, at the GA in Berlin it was decided to change the name of the Division to the *Division of Organic and Biomolecular Chemistry* in order to account for the current activities in bioorganic/biomolecular chemistry. At the same time, the previous Commission on Biotechnology was transferred to the Division.

The Division Committee has discussed actions, which will stimulate the involvement of colleagues from developing countries in the work of IUPAC. Thus, the Division has encouraged and supported the organisation of IUPAC sponsored workshops, symposia and conferences in Brazil, Egypt, India, Thailand, and PR China.

A further strategic goal, which has been discussed and applied in our activities, is to strengthen and widen our contacts with industry and society. Some of the current projects and project proposals are planned to satisfy this goal particularly in connection with our work within our two current projects on *Green/Sustainable Chemistry* and a project on *Molecular Basis of Biodiversity; Conservation and Sustained Innovative Utilisation*.

The Division has initiated and supported several international conferences, symposia and meetings on various aspects of organic chemistry and topics related to life sciences and material science. Reports and symposia in prints have been published in *Chemistry International* and *Pure and Applied Chemistry*. Reports on nomenclature issues and other general organic chemical topics are at present on review and will be published by the end of 2001.

Report

Current activities of the Division have been summarised according to the Goals in the IUPAC Strategic Plan.

1. IUPAC as a scientific, international, non-governmental body addressing global issues involving chemical sciences.

An extensive project on *Molecular Basis of Biodiversity; Conservation and Sustained Innovative Utilisation* was initiated within the Subcommittee on Bioorganic Chemistry (now changed to the Subcommittee on Biomolecular Chemistry) by Professor Upendra Pandit and Professor Albert E. Fischli. The goal of the project is to develop, by international consultations, consensus recommendations for mutually beneficial co-operation between scientists from bio-affluent regions on one side and universities as well as companies from high tech countries on the other. The final recommendations will be published under the umbrella of ICSU/IUPAC in PAC/CI and eventually in other journals.

Although the requested ICSU funding was not approved, the present project activities have proceeded because of a successful start of the project and considerable interest from UNESCO and WIPO (World Intellectual Property Organisation). The project was discussed at meetings and workshops in Thailand, Brazil and PR China. A final meeting is planned to be held in Turkey in connection with a IUPAC sponsored conference on biodiversity (IBOC-3) in Antalya, Turkey, from 3-8th November 2001. The first conference (ICOB-1) of this series was organised in Thailand 1997. A second, also successful, conference was held in Belo Horizonte, Brazil, in 1999 (ICOB-2).

2. IUPAC will provide tools and a forum to assist international advances of research in chemical sciences.

The Commission III.3, Photochemistry, has its roots in the Division of Organic Chemistry, but its scientific grounds have become very much broader and covers today pure and applied topics of interdisciplinary nature (e.g. photosynthesis, solar energy, material science, and radiation chemistry). The future activities within this area have been discussed by the chairs of our present commissions on Physical Organic Chemistry (Prof. Perrin) and Photochemistry (Prof. Weiss) and was also discussed fully, with informed input provided by our Division Member Professor Silvia Braslavsky, who is a physical chemist. The Division has agreed that an interdivisional committee on photochemistry should be established after the current Commission ceases to operate. Professor Braslavsky will liaise with members of other divisions to help establish such a committee.

A proposal by the chair (Professor Charles Perrin) of the Commission III.2, Physical Organic Chemistry, to establish a *Subcommittee on Structural and Mechanistic Organic Chemistry* to replace the present Commission III.2 has been approved by the Division. Such an arrangement will maintain the continuity and take care of current initiatives and potential new activities in this important area of chemistry.

3. IUPAC will assist chemistry related industry in its contributions to sustainable development, wealth creation and improvements in the quality of life.

The increasing knowledge in natural sciences and the application of this knowledge is the driving force for development and welfare of mankind. Chemistry plays a central role in this development. Chemistry also provides the tools for a green and sustainable development. Knowledge in the area of green/sustainable chemistry has to be integrated in the planning of all research and development in chemistry. There are

specific research topics related to the development of green and sustainable processes, which need the input of new technology and novel chemistry. Commission III.2, Physical Organic Chemistry, and the Subcommittee on Organic Synthesis have jointly started activities in this important area. A special issue of *Pure & Applied Chemistry* [72 (2000) 1207 – 1403] has been published on this topic. Following constructive discussions within the Division, it has been agreed that Prof. Pietro Tundo will organise an interdivisional Green/Sustainable Chemistry Committee, which shall be a reference group for current projects on this topic. Two project proposals are at present on evaluation for IUPAC support. One project deals with educational aspects and the other with strategies for improving the public awareness of green / sustainable chemistry.

An IUPAC sponsored *International Symposium on Green Chemistry* was organised in India (Delhi) in 10-13 January 2001. A workshop on green / sustainable chemistry and a summer school for graduate students will be organised in Venice in September 10 – 16, 2001.

Our current activities on the IUPAC/ICSU project *Molecular Bases of Biodiversity; Conservation and Sustained Innovative Utilisation* presented above (under the Goal 1) is another good example of the 3rd IUPAC Strategic Goal.

4. IUPAC will facilitate the development of effective channels of communication in the international chemistry community.

Nomenclature is an essential issue for proper and clear communication in chemistry. The molecular diversity and complexity creates difficult nomenclature problems, which need attention. General IUPAC strategies on *Representation of Molecular Structure: Nomenclature and Its Alternatives* have been discussed at a IUPAC Strategy Round Table Meeting in Washington, 10-11 March 2000, and an *ad hoc* Committee on Chemical Identity and Nomenclature Systems has been established with Dr. Alan D. McNaught from our Division as Chairman. A new Division for Chemical Identity and Nomenclature Systems have been proposed by the Executive Committee and will be discussed at the General Assembly in Brisbane. The Division of Organic and Biomolecular Chemistry support this proposal. Such a general approach on nomenclature problems is very good, particularly in view of the possibilities of using computer-assisted methods and graphical representations.

Our Commission III.1 on Nomenclature of Organic Chemistry (CNOC) is currently working on an extensive document on Pnames (preferred names of organic compound for use in context of courts, customs, health safety, environmental regulations). The document is now ready for reviewing. Further nomenclature activities concern fullerene and phane nomenclature, which shall be finished by the end of 2001. A joint Committee has been established with the Commission on Nomenclature of Inorganic Chemistry (CNIC) for organometallic nomenclature.

A project proposal has been put forward by Professor F.C. De Schryver with the aim to establish guidelines for set of terms and methods accessible to those entering the field of single molecule spectroscopy. The Division has agreed to fund half of the limited budget request for this project, assuming that the matching half should be forthcoming from the Division of Physical Chemistry.

Protecting groups are frequently used in organic synthesis. The Subcommittee on Organic Synthesis has initiated a project to produce guidelines for abbreviations of protecting groups. The goal of this project has been to establish a set of rules for abbreviations of protecting groups, which allow the presenting

information in scientific literature clearly and unambiguously. A draft of the guidelines has been prepared by David StC. Black, Chin-Kang Sha and Leiv K. Sydnnes.

The Division has initiated and supported several international conferences, symposia and meetings on various aspects of organic chemistry and topics related to life sciences and material science (for a list of IUPAC sponsored symposia see below: "Tabular material"). Reports and symposia in prints have been published in *Chemistry International* and *Pure and Applied Chemistry*.

5. IUPAC will promote the service of chemistry to society in both developed and developing countries.

The current projects on *Molecular Basis of Biodiversity; Conservation and Sustained Innovative Utilisation* (see Goal 1) and *Green/Sustainable Chemistry* (see Goal 3) provide accomplishments, which fit the Goal 5.

6. IUPAC will utilize its global perspective to contribute toward the enhancement of education in chemistry and to advance the public understanding of chemistry and the scientific method.

An important general topic, which has been discussed within the Division, is the problem of improving science knowledge in society and in particular to advance the public understanding of chemistry. This important issue was brought up concerning our discussions on the creation of a common organic chemistry curriculum for academic undergraduate studies as proposed by Professor Norma Nudelman (Argentina). In our discussions we identified the need for activities in order to advance the knowledge among teachers in secondary and high schools. We hope to continue these discussions on an interdivisional level. We also hope that IUPAC will take a decision to support and contribute to the Chemistry Olympiad for high school students, which has become a much-appreciated event among students and teachers.

7. IUPAC will make special efforts to encourage the career development of young chemists.

We are encouraging young chemists to become active members of our committees and task groups. The division is involved in the nomination procedure for the Thieme / IUPAC Award, which is a prestigious prize to a young chemist in the field of synthetic organic chemistry. The division is also engaged in the organisation of a Summer School on Green Chemistry for graduate students, which will be held in Venice in September 10 – 16, 2001. This is a part of our efforts to promote educational aspects of Green Chemistry.

8. IUPAC will broaden the geographical base of the Union and ensure that its human capital is drawn from all segments of the world chemistry community.

Discussions have been initiated in order to cooperate closely with the *International Society of Chemical Ecology*, which organises annual meetings on topics closely related to those of the IUPAC symposia on Natural Product Chemistry, Bioorganic Chemistry and Biodiversity. Our aim is to invite this Society to become a member organisation of IUPAC.

9. IUPAC will encourage worldwide dissemination of information about the activities of the Union; and

10. IUPAC will assure sound management of its resources to provide maximum value for the funds invested in the Union.

These two goals are rather general and have only served as guidelines for the work of the Division.

Composition, nomination and election of the Division Committee

At the end of 2001, six members (Breslow, Gennari, McNaught, Sakurai, Scott, Sha) of the Committee will retire and a Nominating Committee will select nominees from among suggested chemists. A Nomination

Committee composed of five well-known chemists have been established. The nomination procedure is now almost finalised and the Division Electorate will soon be approached for the formal election, which hopefully will be carried out by e-mail and be finished before the General Assembly meeting in Brisbane. The Division has noted that National Representatives could be appointed usefully to augment some of the sub-committees. Division Committee members have been canvassed for suggestions, which was forwarded to the Nomination Committee.

Tabular material

Scientific meetings

IUPAC sponsored symposia and scientific meetings approved and supported by the Division:

5 th Bioorganic	Poona	30 Jan – 4 Feb, 2000
13 th Organic Synthesis	Warsaw	1-5 July, 2000
15 th Physical Organic	Goteborg	8-15 July, 2000
Organo-metallic	Shanghai	23-28 July, 2000
18 th Photochemistry	Dresden	22-27 July, 2000
22 nd Natural Products	Sao Paulo	4-8 Sept, 2000
Green Chemistry	Delhi	10-13 Jan. 2001
23 rd Natural Products	Rome	2002
OMCOS	Taipei	22-26 July, 2001
Biodiversity	Turkey	3-8 Nov, 2001
6 th Bioorganic	Toronto	2002
14 th Organic Synthesis	Christchurch	July, 2002
16 th Physical Organic	San Diego	Aug, 2002
15 th Organic Synthesis	Nagoya	2004
7 th Bioorganic	UK	2004

Publications

Apart from abstracts and proceedings from various scientific meetings, which have been published in *Pure and Applied Chemistry*, *Chemistry International* and other international journals and books, the Division has been engaged in the preparation and publication of an extensive symposium in print on *Green Chemistry*, which has been published in *Pure and Applied Chemistry* **72** (2000) 1207 – 1403.

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