

PRESIDENT'S REPORT ON THE STATE OF THE UNION

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The two years since our last General Assembly have been very active for IUPAC. The approval by the Council at Berlin of the reorganization of the management of IUPAC's scientific work, changing the Union's scientific structure from one based on permanent commissions to one based on projects, has led to changes in the responsibilities of the Division Presidents and Division Committees, and the establishment and implementation of project approval and evaluation processes.

We have implemented two new programs that were also approved by Council at Berlin – the IUPAC Prize for Young Chemists and the support of conferences in developing and economically disadvantaged countries. Both programs address important needs and provide high visibility to IUPAC.

We have undertaken comprehensive reviews of the Union's activities in three important areas – systematic chemical nomenclature, chemistry education, and interaction with the chemical and pharmaceutical industry. We are now prepared to recommend organizational changes and strategies for pursuing future work in these areas.

The Union's regular activities in contributing to the language and scientific-industrial framework of chemistry continued with the publication in 2000 of 21 recommendations and reports in our official Journal, *Pure and Applied Chemistry*, publication of 3 books, and the publication of two special issues of *Pure and Applied Chemistry*, one on the topic of "Nanostructured Materials," the other on "Green Chemistry". In dissemination of information, the bimonthly newsmagazine *Chemistry International* highlights current activities and general policy issues, and the informal *IUPAC e-News* provides timely updates. The IUPAC web site continues to be a major source of information for members of IUPAC bodies. It is also becoming the public face of IUPAC and is regularly accessed for information about all aspects of chemistry by scientists and students worldwide. A strategy for *CI* has been developed that will better integrate these three approaches and improve the readability of *CI*.

For the first time IUPAC has published its *Biennial Report* in the format of the Strategic Plan and in an attractive format. We have also recently developed an information brochure with particular emphasis on the Union's interactions with industry.

The report that follows is intended to highlight activities and actions that are important to the Union as a whole. The individual reports of the Division Presidents and Standing Committee Chairmen will describe the many varied accomplishments of their respective bodies.

1. MISSION STATEMENT AND THE STRATEGIC PLAN

My predecessor, Professor Joshua Jortner, noted in his report on the State of the Union that the future mission and function of IUPAC should rest on the response to the following current major trends in the Chemical Sciences:

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- *Globalization of the Scientific - Technological Endeavor.* One of the hallmarks of our era is the rapid economic, technological and communication expansion on the international level, which have an outstanding impact on the enhancement and expansion of international scientific and industrial activity in the chemical sciences.
- *Changes in the Chemical Sciences and Technology.* The science-technology chemistry world is undergoing a metamorphosis, reflecting the dominance of interdisciplinary unification, with the borders between the traditional research areas in chemistry being eroded and the merging between basic research and industrial applications.
- *The Fast Expansion of the Chemical Sciences beyond their Traditional Borders.* Modern chemistry spans the realm of material science, environmental science, geological sciences, and biomolecular science, wherever molecular information is central and essential. The impact of modern chemistry on the broad fields of materials, health, and environment is seminal.
- *The Mission-Oriented Service of Chemistry.* It is a major responsibility of the world chemistry community to contribute to the service of chemistry to international society in the areas of health, environment, and education, and to global issues of capacity building in the developing world.

IUPAC serves as a scientific, international, non-governmental, objective body in addressing the global issues involving the Chemical Sciences. In recognition of the role of chemistry as a central science in a wide range of fields, the term “Chemical Sciences” is used here to refer to chemistry, broadly defined, and to those disciplines and technologies that make extensive and significant use of chemistry.

Although we have long had Objectives specified in our Statutes, we now state succinctly:

IUPAC’s mission is to advance the worldwide aspects of the chemical sciences and to contribute to the application of chemistry in the service of Mankind. In so doing, IUPAC promotes the norms, values, standards, and ethics of science and advocates the free exchange of scientific information and unimpeded access of scientists to participation in activities related to the chemical sciences.

The IUPAC Strategic Plan (SP), adopted initially in 1998, is intended to be reviewed biennially and revised as needed. The 2000-2001 SP included only a small number of changes in Strategic Thrusts to update it. The next revision of the SP is expected to be more significant.

A full discussion of the objectives of the Strategic Plan and suggestions for modification is scheduled for the meeting of Council.

To facilitate the revision process, the President has appointed a small *ad hoc* committee, chaired by Dr. Edwin P. Przybylowicz, with membership drawn from IUPAC bodies and other chemists interested in IUPAC and with broad geographic representation. Dr. Przybylowicz is the only Executive Committee member on the Committee. The

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committee has been asked to undertake this review with the aim to bring more focus to the plan. The committee will consider input from discussions at the Bureau and Council meetings, review the existing SP, and draft options of an updated SP for 2002-2003 to be discussed at a meeting of the Executive Committee in November 2001. A final version is expected to be submitted by the Executive Committee to the Bureau for approval by the end of the year.

Objectives for the SP revision:

- Update the strategic goals with any “new” information.
- Combine goals and thrusts where possible to streamline the document.
- Provide a better focus on fewer, more clearly stated goals.
- Insure that a good “customer focus” is provided.
- Consider the strategic intent and focus process to shape the SP.

The Executive Committee has scheduled a special session for the end of 2001 to consider the revised Strategic Plan and other strategic issues. During this two-day session, the Committee will consider a number of major strategic and policy issues in addition to the revised Strategic Plan. The goal of the meeting will be to bring more focus to the work of the Union and to ensure that the Union does what is wanted and what it can best do. It is expected that by considering the revised Strategic Plan, as proposed by the *ad hoc* Committee, and other inputs, such as those of the NAOs during the Council meeting, the Executive Committee will be able to decide on a set of actions to continue moving the Union forward.

2. CHANGES IN ORGANIZATION AND MANAGEMENT OF IUPAC'S SCIENTIFIC WORK

Council approved at Berlin a policy and an operational program based on the conceptual framework that the Union represents and serves the entire world chemistry community. The objective is to improve quality, relevance, international impact, and effectiveness of the Union's scientific work. The integrated program has required major changes in the responsibilities of the Division Presidents and Division Committees, in the election procedures on the Division level, and in project approval.

One of the major objectives of the new program is to solicit ideas for IUPAC projects from the worldwide chemistry community and to set up short-term Task Groups to carry out the projects, with membership open to the entire community. In line with this objective, representatives of the Division Committees met this past week to share experiences on soliciting project proposals from the wider global chemical community. Emphasis will continue to be placed in the coming biennium on this outreach effort.

As a result of the program adopted at Berlin, the Division Committees have been given greatly increased responsibility, and they have responded in a very positive manner, as you will hear in some of the Division Presidents' reports to you this morning. A system has been set up at the Secretariat to receive proposals for new projects, which are now subject to outside refereeing and rigorous evaluation. A Project Committee was set up within the Bureau to handle the review and funding of larger projects and those that are

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interdisciplinary. I would like to thank our former Secretary General, Professor Gerrit den Boef, and the members of the Project Committee for their excellent work this past biennium in establishing the processes and procedures for carrying out the task assigned to them. Also, an Evaluation Committee, under the chairmanship of Professor Gerhard Schneider, an Elected Member of the Bureau was formed to provide retrospective evaluation of each project and thus to provide an objective assessment of our long-range accomplishments. This Committee has also done excellent work this biennium to develop the criteria and methodology for their future work.

3. IUPAC CONGRESSES

The biennial 38th IUPAC Congress, held concurrently with the General Assembly, is the second Congress to be fully guided by the policy decision approved by the 65th Bureau in 1994, based on the report of Prof. G. Modena and Prof. J. Jortner. IUPAC acted to make the Congress a central scientific international event by fulfilling the following goals: To present the most outstanding relevant developments in modern chemistry; to inspire high standards of excellence in pure and applied chemistry research; to attract outstanding scientists to present central lectures on modern chemical research; to inspire the young generation of chemists in developed and developing countries.

The last two Congresses, in Geneva and Berlin, were outstanding scientific conferences, and there is every indication that the Congress in Brisbane will be equally successful. I extend deep thanks and appreciation to the Royal Australian Chemical Institute (RACI), its Board, President, National Director and enthusiastic staff for the superb organization of the Congress, and to the International Advisory Board and its Chairman Professor Y. T. Lee for shaping the outstanding scientific program.

Future development of the chemical sciences lies largely in the hands of the younger generation of scientists. It is a central goal of IUPAC to contribute to the development of human capital in academic and industrial chemistry. Participation in major scientific events such as the IUPAC Congress is imperative for young scientists to become familiar with the developments at the frontiers of chemistry. I am proud of the program jointly sponsored by RACI, IUPAC and UNESCO to support the participation of young scientists from developing countries to the Congress. These young scientists will participate by presenting posters in addition to attending the Congress events.

The 39th IUPAC Congress will be held in Ottawa, Canada in 2003. The International Advisory Board (IAB) has been appointed and has started, together with the National Committee, to shape the scientific program. I am indebted to the Chairman of the IAB, Professor A. McAuley for this important contribution.

4. NOMENCLATURE

Nomenclature is an activity that for many chemists defines IUPAC. It has been important for the past 80 years and will continue to be important in the future. As part of the reorganization of IUPAC work, it was felt that this was an area that required special care and attention.

The Union currently has four Commissions devoted to the subject of chemical nomenclature: Commission on Inorganic Nomenclature (CNIC), Commission on Organic

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Nomenclature (CNO), Commission on Macromolecular Nomenclature, and Joint Commission on Biochemical Nomenclature (JCBN) (in collaboration with the International Union of Biochemistry and Molecular Biology). In recognition of both IUPAC's long-standing interest in this subject and the need for planning the continued development of this complex and somewhat esoteric subject, the Officers, at Berlin, accepted the Secretary General's proposal to develop a long-range strategy by initially convening a meeting of nomenclature experts and broad categories of users of chemical nomenclature. He and Dr. Alan D. McNaught (Royal Society of Chemistry), who has been active on CNO, IDCNS and CPEP, organized a Strategy Roundtable on *Representations of Molecular Structure: Nomenclature and Its Alternatives*.

The group assembled for this meeting represented experts in organic, inorganic, biochemical and macromolecular nomenclature; users of nomenclature in academia, industry, the patent, international trade, health and safety communities; journal editors and publishers; database providers; and software vendors - a total of 41 participants from ten countries. Dr. McNaught chaired the meeting. Twenty-five of the participants provided pre-meeting discussion documents that described perceived needs for advances in nomenclature and presented proposals for IUPAC activities. These documents provided a framework for wide-ranging discussions during the first day. On the second day, a number of recommendations to IUPAC were considered. Some deal with "classical" nomenclature issues, but most involve the increasingly important contributions of computer representations of structure and computer databases. One important recommendation concerns the organizational structure in IUPAC to facilitate coordination and planning of nomenclature projects.

There will be a discussion of the Bureau's proposal for the organization of the Union's nomenclature activities later in the Agenda. However, this effort is an example of the new IUPAC way of doing things. First the customers are asked what they need and how can IUPAC best contribute to meeting that need. Next, the question is asked, should IUPAC be doing this? Finally, a program or project is developed that addresses the expressed needs of the chemistry community and that involves both people who have been active in IUPAC previously and others who have not.

5. EDUCATION

The central issue of science education in general, and education in chemistry in particular, pertains to the preservation and advancement of global human capital. Meaningful contributions to this endeavor constitute a major challenge for the Union. IUPAC, as an international worldwide organization, must consider in this context the diversity of cultural approaches and the different conditions and needs in distant parts of the world. It should be emphasized that chemistry, due to its interdisciplinary nature, provides the basis for scientific training in the natural sciences.

The problems facing the global chemistry education system involve the erosion of scope and quality of science education, resulting in science illiteracy in the developed countries and the need for qualified scientific manpower in less developed countries. At the General Assembly in 1999, Prof. Joshua Jortner assumed responsibility for organizing an *ad hoc* IUPAC Education Strategy Development Committee (ESDC). Prof. Peter W. Atkins, who is internationally known in the field of chemical education, was recruited to

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be the Chairman of the ESDC. Following two meetings, the ESDC concluded its task by preparing a report that puts forth recommendations for possible future directions of IUPAC's activities in chemistry education and the public appreciation of chemistry. I would like to express my appreciation of the work done by Prof. Atkins and the members of the Committee. They have provided a report that will lead to major changes in the ways IUPAC responds to the needs of the global chemistry community in this important area.

IUPAC has long had educational programs, both in the scientific Divisions and in the Committee on Teaching of Chemistry, but they have been somewhat fragmented. The proposals by the ESDC now provide a framework for developing an overall strategy for ways in which IUPAC can contribute to chemistry education in a way that complements the programs of national chemistry organizations. A special Working Party of the Executive Committee has evaluated the recommendations of the ESDC for feasibility and implementation. The recommendations of the Bureau based on the work of this Working Party will be discussed later in the Council agenda.

6. IUPAC-INDUSTRY RELATIONS

The Bureau in 1999 appointed an *ad hoc* Committee on IUPAC-Industry Relations. The members of this Committee were industrial scientists, from both IUPAC and outside, with myself as Chairman. As a result of the recommendations of this group, the Committee on Chemistry and Industry (COCI) will be reorganized to better serve as a communications forum for industry with IUPAC. COCI, with its revised Terms of Reference and membership, will work to increase the participation of industrial scientists in IUPAC's work and to improve communications with the global chemical industry. In addition, COCI will work to strengthen its ties with Committees and Divisions, increase its efforts to enroll more Company Associates, continue Workshops on Safety in Chemical Production, and invigorate the Training Program on Safety

As part of my personal contribution to this effort, I have met with the heads of a number of regional and global chemical trade associations. These meetings have led, I believe, to a greater appreciation of IUPAC's work by these groups.

There has traditionally been a meeting of national Chemical Society presidents held in conjunction with the IUPAC General Assembly, and in 1998 and 1999 IUPAC convened meetings of the four Regional Chemistry Federations. As Vice President, I proposed in my Critical Assessment that we should attempt to combine these two groups and also invite the participation of leaders of industry and chemical trade associations in a World Chemistry Leadership Meeting (WCLM). I am pleased to report that the first WCLM will take place on Monday, 9 July, immediately after the IUPAC General Assembly and will address a number of issues of concern to the assembled chemical societies and leaders of chemical industry.

At the Berlin meeting of Chemical Society presidents, organized by the Gesellschaft Deutscher Chemiker, IUPAC was requested to organize a meeting on the topic "Sharing Responsibility for Our Science – Chemistry Across National Boundaries" in order to provide a forum for examining ways that chemistry can be strengthened in developing

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and economically disadvantaged countries. The entire morning session of the WCLM will be devoted to this subject.

7. IUPAC'S PUBLICATIONS

The principal output from much of the Union's scientific work is publications, particularly recommendations and reports from our Commissions and Committees, and lectures from IUPAC-sponsored symposia. Our broad publication program includes the journal *Pure and Applied Chemistry*, the news magazine *Chemistry International*, and a wide range of books, from the basic volumes on symbols, nomenclature, and terminology to compilations of evaluated data and specialty books of all sorts.

Based on an analysis of the future of the scientific publishing market, the Committee on Printed and Electronic Publications recommended, and the Executive Committee approved, the change of *PAC* from having an official publisher to being published by IUPAC. The driving force for this change was the desire to achieve greater independence in how the Union approaches electronic publishing. The financial analysis indicated that there was little financial risk in this change. This change was made with the January 2000 issue of *PAC* and the results have met our expectations, both in terms of the improved quality of the journal and improved financial results.

As a consequence of the severing of our relationship with Blackwell Science, we purchased the stock of IUPAC books published by Blackwell. The Secretariat has been selling these books directly since the middle of 2000. At the end of 2000, a number of IUPAC titles were also made available through Amazon.com.

In April 2000, the Executive Committee appointed an *ad hoc* Committee to study the overall strategy of the Union with regard to its newsmagazine, *Chemistry International*. This committee, called the *Chemistry International* Strategy Development Committee, Chairman Dr. D.H. M. Bowen, former chair of CPEP, presented its final report to the Executive Committee in April 2001. The report can be summarized by saying that *Chemistry International* needs a better look and feel. It should be seen as a news magazine that reports on IUPAC activities, as well as issues in chemistry of international interest, rather than a collection of reports from IUPAC bodies. The CISDC report emphasizes the importance of integrating the three main news channels of the Union, *Chemistry International*, the web site, and *e-News*. The Executive Director was asked to prepare an implementation plan with associated costs. This plan was reviewed at the recent Bureau meeting and the Bureau's decisions will be discussed later in the agenda.

8. DISSEMINATION OF INFORMATION

The IUPAC web site (<http://www.iupac.org>) has been greatly expanded over the biennium. The number of visitors to the site has increased from less than 3000 in March 1998 to almost 200 000 in January 2001. Five mirror sites are currently active, the RSC in the UK, SUNSite Germany, SUNSite South Africa, the Korean Chemical Society, and SUNSite Japan.

The web site not only contains all the material in the *IUPAC Handbook*, but also a list and description of the current projects being worked on by IUPAC Commissions and Committees, current contact information for members of IUPAC bodies, a complete list

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of IUPAC publications (including book ordering information), title pages of recent issues of *Pure and Applied Chemistry*, and the complete text of *Chemistry International* since July 1997. In addition, a number of Commissions have either established Home Pages on the IUPAC web site or moved existing Home Pages to the IUPAC site. These Commission pages give detailed information about the work of the Commission.

A significant addition to the Union's communication with not only the active and former participants in IUPAC activities, but with interested people worldwide, is the *e-Newsletter*. Since it was first emailed on 28 June 2000, five e-Newsletters have been dispatched to the pool of current members, including NAOs, Associate NAOs, Associated Organizations and Company Associates. Positive feedback has been received regarding the value of this as a means of communicating with our members. A short note published in *CI*, September 2000, describes the initiative and calls for subscribers. In addition to the initial 1360 members, 44 individuals have subscribed through the web site. Subscriptions are self-managed; an individual can add or remove him/herself from the list without control, or 'manual' intervention.

9. SERVICE OF CHEMISTRY

The CHEMRAWN series continues to address issues at the interface of science and society. A CHEMRAWN Conference on Green Chemistry was held on 9-14 June 2001.

At the Berlin Council meeting, a new initiative to encourage career development of young scientists was approved. The IUPAC Prize for Young Scientists, based on their doctoral research, will be awarded annually, with the winners being brought to the IUPAC Congress to receive their prizes and participate in the scientific activities. The nine prizewinners for 2000-1 received their prizes at the opening ceremonies last Sunday. Each prizewinner also presented his/her work in a poster at the Congress.

The first Goal in our Strategic Plan addresses IUPAC's responsibility "to serve as a scientific, international, nongovernmental body in objectively addressing global issues involving the chemical sciences." Within recent months IUPAC has been asked to take on just this type of task for the Office for Prohibition of Chemical Weapons (OPCW), the international body set up to administer the Chemical Weapons Convention (CWC), now signed by 174 countries, which is designed to "Determine for the sake of all mankind to exclude completely the possibility of the use of chemical weapons." We have already had some experience in this area through the *Ad hoc* Committee on Chemical Weapons Destruction Technologies, chaired by Prof. Joseph Bunnett, which is just completing its work. The issues now are much broader and involve potential new areas of science and technology that might be important to consider when the CWC is considered for possible revision in 2003.

IUPAC was considered by OPCW to be the only organization with the relevant expertise in chemistry that is truly international and will have the credibility to offer independent advice. In April, I met with the Director-General of OPCW to formalize our interaction and to propose the type of study and analysis that we might undertake during 2001-2 in preparation for the diplomatic conference in 2003 to consider changes to the treaty. In two weeks, we will convene a small planning meeting in The Hague that will bring together experts from several countries to develop a detailed action program. The CWC

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and the inspections of industrial plants carried out under the treaty are naturally of great concern to several sectors of the chemical industry, and we expect to cooperate fully with industrial representatives. I believe that this activity is important for the image of chemistry and for international public policy, and I expect that the Union will be able to provide the necessary leadership and objective advice.

10. IUPAC ACTIVITIES IN LESS DEVELOPED COUNTRIES

A new initiative to promote sponsorship of IUPAC conferences in developing and economically disadvantaged countries was approved by Council at Berlin. This initiative provides funds to help IUPAC member countries that often cannot hold major international conferences to do so. Holding an international conference is an excellent way to help scientists in developing countries maintain the contacts that are a necessary part of participating at a high level in modern chemistry. It also enables young scientists to participate in a major international conference, an opportunity many of them rarely receive. Five conferences were awarded support in the current biennium for a total of USD 40 000:

- International Symposium on Green Chemistry, Delhi, India, January, 2001
- 3rd IUPAC International Conference on Biodiversity, Antalya, Turkey, November 2001
- XIXth IUPAC Symposium on Photochemistry, Budapest, Hungary, July 2002
- 10th International Symposium on Solubility Phenomena, Varna, Bulgaria, July 2002
- European Molecular Liquids Group Annual Meeting, Samos, Greece, September 2002

11. GLOBALIZATION

IUPAC currently has 45 National Adhering Organizations, which include the vast majority of the world's most developed chemistry economies. Yet, there are a significant number of countries that are major contributors to the chemical sciences and the chemical industry but which do not currently adhere to IUPAC. In all our contacts with international Chemistry Federations and Societies, we are continually exploring ways by which such countries can be brought into the IUPAC family. Indeed, as we broaden the scope of the Union's programs, we must make it clear why these countries will benefit from membership in IUPAC.

Currently there are 17 Associate National Adhering Organizations, some of which clearly are very close economically to being able to participate fully in IUPAC. There are other members of this group that are currently less developed and less able to take on the financial responsibilities of membership in IUPAC. A large number of other countries currently have no formal association with the Union but might benefit from a closer alliance.

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Overall, our message to the world's chemists is one of openness. We are restructuring our scientific programs to permit any scientist anywhere in the world to propose projects that will benefit international science. We have made it easier for top-notch scientists in countries that currently do not adhere to IUPAC to participate in the Union's projects and to serve on its scientific bodies. We have made it clear through our Strategic Plan and through our follow-up actions that IUPAC believes in the service of chemistry to society, worldwide. We are making strenuous efforts to work cooperatively with the chemical and pharmaceutical industries to provide an independent scientific base that will assist them in bringing the benefits of chemistry to mankind. I believe that IUPAC's new and candid approach to the world chemistry community will pay dividends in years ahead, both to the Union and to the science that we serve.

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EPILOGUE

In his report to the Berlin Council meeting President Jortner stated six points that he described as the future message of IUPAC:

- Openness to the fast expansion of the borders of the chemical sciences;
- Response to conceptual and structural changes in chemical research and technology;
- Perpetuation of interdisciplinary unification, high quality, relevance and the global dimension in activities;
- Contribution to the globalization of the scientific endeavor;
- Adherence to the principles, norms, values and ethics of science.
- Recruiting “Human Capital” for IUPAC;

IUPAC has embarked on a new course for the future. The changes that have been made and that will take full effect starting in 2002 are intended to address these six points. IUPAC can only remain important to chemists by continuing to meet their needs for an organization that helps them do their work. We must continue to ask the two fundamental questions:

- Why should IUPAC be involved with this activity?
- What does the customer need/want?

ACKNOWLEDGMENTS

I am indebted to all my colleagues in the Union, particularly the present and former Officers and Members of the Bureau and the Executive Director, who have given me invaluable assistance and advice. I would like to extend my deep appreciation to the ‘IUPAC Family’ and all the volunteers around the world, for their personal commitment to the objectives, goals, and activities of IUPAC. Their contributions do and will promote, enhance, and perpetuate the impact of the Union’s activities on the international level, both in scope and in intrinsic significance. The dedication of all the officers and members of IUPAC bodies has been especially evident as we meet the challenges posed by the implementation of our new way of organizing the work of the Union. It is by the expertise and dedication of these extensive and intensive voluntary activities that IUPAC has served and will continue to serve the world chemical research and industrial community as the outstanding international authority on the Pure and Applied Chemical Sciences.