IUPAC POLYMER DIVISION (IV)

Report to Council for 2003 - 2005

Structure of Report

Section I highlights and summarises key points in terms of achievements and developments.
Section II describes Division IV's activities according to the goals of the IUPAC Strategic Plan.
Section III summarises the levels of work and output in Division IV's areas of activities
Section IV lists collected data detailing the projects, conferences and publications with which Division IV has been involved.

I. Highlights and Executive Summary

- To reflect the continuing expansion of its work to include polymers as substances and materials as well as individual macromolecules, the Division has changed its name from Macromolecular Division to **Polymer Division**

- Associate and Titular Members have defined, co-ordinating roles to play in the activities of the Division.

- Two more areas of activity, namely, the **Structure and Properties of Commercial Polymers** and the **Modelling of Polymerisation Kinetics and Processes**, are now structured as **Sub-Committees**.

- The **areas of activity** of the Division and the associated co-ordinators are:

  Sub-Committee on the Structure and Properties of Commercial Polymers
  (Co-ordinators R.S. Bailey (AM), S.C. Kim (TM))

  Molecular Characterization of Polymers (Co-ordinator H. Pasch (AM))

  Sub-Committee on the Modelling of Polymerisation Kinetics and Processes (Co-ordinator M. Buback (TM))

  Sub-Committee on Macromolecular Terminology (Co-ordinators M. Hess (AM) (Chairman), R.G. Jones (TM) (Secretary))

  Developing Polymer Materials Systems (Co-ordinators C. Ober (TM), J. Vohlídal (AM), W.J. Work (TM))

  Education (Co-ordinators J.-Il Jin (TM), R.D. Sanderson (TM), J.-P. Vairon (AM))

  Conference Sponsorship and Recruitment at Conferences
  (Co-ordinators P. Kubisa (TM), S. Penczek (AM))

Electronic Publications and Communications
(Co-ordinators R.G. Jones (TM), W.J. Work (TM))

Division Strategy (Co-ordinators K. Horie (TM), J.-Il Jin (TM))

- The Division pursues a policy of having all its reports and recommendations available on the **Division web site**.

- The Division's work on the **Structure and Properties of Commercial Polymers** continues to make a significant input in this vital industrial and academic area. It represents an enormous effort and a sizeable industrial investment in terms of facilities and manpower. The work involves 76 active task group members from 17 countries, with 30 members from industry and 46 from academia and research institutes. The Division sees the work as a flagship activity. 7 papers have been published in the last two years (publications [23,24,27,29,33-35]). There are 2 continuing projects, 3 new projects, 7 projects in the final publication stage, 2 project submissions being reviewed and 5 projects under feasibility study.

  Activities are now organised by the **Sub-Committee on the Structure and Properties Characterisation of Commercial Polymers** and Rob Bailey (Europe) and Sung Chul Kim (East Asia), the Co-Chairmen of the Sub-Committee, co-ordinate the projects. Since the GA in Ottawa, there have been 6 S-C meetings, 4 in Europe and 2 in East Asia.

  A comprehensive summary of the Division's work on the structure and properties of commercial polymers since 1963 is now available on the Sub-Committee web site.

- The projects under the **Molecular Characterisation of Polymers** involve about 36 task group members. The work is presently based on evaluating and developing size-exclusion chromatography methods and the Division is seeking to broaden the investigations to include other methods.

  The co-ordination of projects in this area is now under Harald Pasch. During the last year, 1 project has been completed, resulting, so far, in 2 publications (publications [41,42]). There has also been 1 publication from an earlier project [40]. 2 new projects have been started, one of them interdivisional. There is also a terminology project associated with molecular characterization that is run by the Sub-Committee on Macromolecular Terminology and is joint with Division V. 3 new project proposals are presently under review.

- The projects in the area of polymerisation are now run by the **Sub-Committee on the Modelling of Polymerisation Kinetics and Processes.** The work is related to polymerisations of industrial relevance. The Chairman of the S-C and the person co-ordinating the projects is Michael Buback. The S-C has 28 members from 12 countries, with 2 members from industry. It has had 1 meeting since Ottawa.

  There are 2 completed projects, 2 continuing projects, 2 new projects and 3 feasibility studies under consideration. In 2003-5, there have been 3 publications and 1 publication is in press [43-46]. Publications continue to receive very high numbers of citations. The S-C is also organising a conference in 2006 (see list of conferences, Section IV).

- The **Sub-Committee on Macromolecular Terminology** has Michael Hess as Chairman and Dick Jones as Secretary. The Subcommittee has 29 members and about 25 additional, active task-group members. The S-C collaborates actively with Division VIII on macromolecular nomenclature projects, with the Chairman of the S-C being an AM of Division VIII.

  2 projects have been completed since Ottawa, resulting in 2 publications [47,48]. The S-C has 13 current projects, with 7 nearing completion, and 4 new projects. Included in these are 7 joint projects, 1 with Division II, 1 with Division V, and 5 with Division VIII. There are also 8 feasibility studies, including a new initiative on bio-related projects. 1 meeting of the S-C (in Paris) has been held since Ottawa.

- The area of activity **Developing Polymer Materials Systems** is co-ordinated by Chris Ober, Jiri Vohlidal and Bill Work. The intention is to keep the projects and activities of Division IV at the forefront of scientific and technological developments in polymer science and technology. Thus far, there have been two dedicated projects on conducting polymers under Jara Stejskal (Institute of Macromolecular Chemisty, Prague). The second project has just been completed and a Technical Report published in Pure and Applied Chemistry [49].

  Notably, in the last year or so, efforts in developing polymer materials systems have led to new feasibility studies in biopolymers (characterization and terminology), field-responsive polymers (terminology), conducting polymers (characterization), and assembly and aggregation (terminology). The intention is that some of these feasibility studies will generate projects in other areas of Division IV's activities.

- The Division continues to see **Education** (in Polymer Science), particularly of young people and for those from educationally hindered countries, as an important activity. About 15 active task-group members are involved and the work is co-ordinated by Jung-Il Jin, Ron Sanderson and Jean-Pierre Vairon, with contributions from Chris Ober.

  During the biennium, the Division will have partially sponsored and supported 1 educational course (Prague) (leading to some of the publications [50-104]) and 1 workshop (Guimaraes, Portugal).

  Increased co-operation with the CCE led to a significant participation of polymer scientists in the IUPAC Conference on Chemical Education in Istanbul in 2004. The next conference in the series will be held in Seoul in 2006 under the Chairmanship of Jung-Il Jin.

  In conjunction with Professor Richard Stein (UMASS, Amherst) the Division is trying to establish a web site for polymer education.

- The Division is grateful to the **Project Committee** for supporting its 2 applications for financial support for UNESCO/IUPAC conferences in South Africa (2004) and Mauritius (2005), related particularly to the IUPAC programme for developing countries. (See list of Sponsored Conferences in Section IV.) These conferences originated through Division IV's initiatives in education.

Support from the Project Committee was also received for a conference in St. Petersburg, involving participants from countries of the former Soviet Union.

- Linked with its work in **Education**, the first awards from the interest on the endowment from the **Samsung General Chemicals Company of South Korea**, were made in 2004. An **IUPAC-Samsung Young-Scientist Award** was presented at the IUPAC World Polymer Congress in Paris and **Bursaries** were given to help 12 students attend the Congress. The first **IUPAC-Samsung Education Award** (2005) will be presented shortly.

- A successful **Symposium on Polymer Education** was held as part of the 2004 IUPAC World Polymer Congress in Paris. This was a new venture that the Division hopes to continue at future WPCs.

- At the IUPAC-sponsored Polymer Networks 2004 Meeting, in Bethesda, USA, the first **IUPAC Poster Prizes** were awarded for posters from young scientists.

- As with Education, the Division continues to place particular emphasis on **Conference Sponsorship**. Largely through the efforts of the Co-ordinators for Conference Sponsorship, Przemyslaw Kubisa and Stan Penczek, and other Division Members, a total of **31 IUPAC-sponsored polymer conferences** have been and will be held in 2003-5, maintaining the high level of conference sponsorship from the previous biennium.

  16 conference volumes of Macromolecular Symposia have been published in 2003-5. See publications [1-16]. In fact, more than half of the issues of Macromolecular Symposia are devoted to IUPAC-sponsored conferences, representing a significant income to IUPAC, some of which is now used to supplement the budget of Division IV.

- The IUPAC World Polymer Congress of 2004, organised through the Division, was held in Paris. It is generally recognised that the biennial IUPAC World Polymer Congress, is the main event in the international polymer conference calendar. This year's Congress, with about 2500 participants, was the largest ever.

  The future WPCs presently planned are 2006 Rio de Janeiro, 2008 Taipei and 2010 Glasgow.

- Regarding **Recruitment at Conferences**, the Division Brochure is distributed at all IUPAC-sponsored conferences. In addition, the Powerpoint presentations issued by the Secretariat have been augmented to emphasise Macromolecular Division activities. Electronic versions of the brochure and the presentations are given to all conference organisers and IUPAC representatives.

- The consideration of **Polymer World and Division Strategies**, started during the last biennium, has continued. As recognised in the change of name of the Division, polymer science and technology is no longer based primarily on the macromolecule but it is central to many modern functional and structural materials. The Division's aims and activities need to change continually and to grow in order to reflect the new emphasis and increasing diversity. The work is co-ordinated by Kazuyuki Horie and Jung-Il Jin.

5 publications [7,17-20] have resulted from the successful **Strategic Polymer Conference** in Kyoto in December 2002 on the **Mission and Challenges of Polymer Science and Technology**. A second strategic conference is planned for New York in 2007 under the Co-Chairmanship of Kalle Levon and Chris Ober.

- Division IV has a **strategic project** on future developments in polymer science under the direction of Mitsuo Sawamoto. Work on the project helps to prepare, together with the Society of Polymer Science, Japan, a continually up-dated booklet giving details of all World Polymer Organisations and their activities.

  During the 2004 World Polymer Congress, a **Symposium on International Collaboration in Polymer Science and Technology** was held for the first time as part of a WPC. The symposium involved representatives from the polymer organisations of many countries and world regions and subsumed the biennial Polymer Summit Meeting in its proceedings. The Division hopes to maintain this type of symposium at future WPCs.

- The basic budget for the biennium has not been sufficient to fund all the division's project activities.

  Division IV is grateful for the additional financial support it has received from the **Project Committee** and the **Division Reserve**. The division also has collaborative projects with Divisions V, VI, VIII and the CCE.

- **Future Plans and Structure**

  - The Division intends to maintain its existing project areas, Structure-Property Characterization, Molecular Characterization, Polymerization Modelling, Terminology and Nomenclature, Developing Polymer Materials Systems and Education and also its efforts in Conference Sponsorship.

  - It will seek to expand its profiles in Molecular Characterization and Developing Polymer Materials Systems and maintain its high level of activity and throughput in all project areas and in Conference Sponsorship.

  - The Division will seek to play a strategic role in defining the important areas of world polymer research through its strategic study and conferences.

  - In order to give continuity to the Division's structure and range of activities, the elections to the Division Committee in 2005 have been to positions designated for particular responsibilities, essentially those listed at the beginning of this report.

II. Division Activities and the IUPAC Strategic Plan

(a) World Leadership

The Division has a **Strategic Study** into the needs and directions of World Polymer Science (project 2002-057-1-400).

It helped to organise the first **Strategic Conference**, in Kyoto, December 2002, on the Mission and Challenges of Polymer Science and Technology. 5 publications [7,17-20] have resulted from this conference. A second strategic conference is planned for New York in 2007 under the Co-Chairmanship of Kalle Levon and Chris Ober.

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The **IUPAC World Polymer Congresses** organised biennially under the auspices of Division IV are the largest and the most important conferences in the international polymer conference calendar. The WPC in 2004 took place in Paris, that in 2006 will take place in Rio de Janeiro, in 2008 in Taipei, and in 2010 in Glasgow.

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(b) Advancement of Research through International Standardisation and Scientific Discussion

The Division is active in several areas under this heading, as witnessed by the work of the Sub-Committees on the Structure and Properties of Commercial Polymers, the Modelling of Polymerisation Kinetics and Processes, and Macromolecular Terminology, as well as its work on the Molecular Characterisation of Polymers and on Developing Polymer Materials Systems. Overall, 10 projects have been completed, 14 new projects have been launched and 18 other projects have been active during 2003-5. 34 reports and papers have been published or are in press (publications [7,17-49]). In addition, a total of 8 meetings has been held by the three Sub-Committees.

(c) Assistance to Chemistry-Related Industry

The Division's work in the four areas of Structure and Properties of Commercial Polymers, Molecular Characterization of Polymers, Modelling of Polymerisation Kinetics and Processes and Developing Polymer Materials Systems is directly related to the needs of chemistry-related industry. Of the detailed figures given under (b), this work accounts for 7 of the new projects, 4 of the continuing projects, 27 of the publications and 7 of the meetings of the Sub-Committees.

In addition, the 31 sponsored conferences and the 16 volumes of Macromolecular Symposia resulting from sponsored conferences deal with topics relevant to chemistry-related industry.

Most of the19 projects on Macromolecular Terminology are of industrial relevance as well as the two publications in this area [47,48].

(d) Fostering Communication between Individual Chemists and Scientific Organisations

The **strategic study and strategic conferences** described under (a) are definite attempts to foster communication between individual chemists and scientific organisations.

The **Symposium on International Collaboration**, organised in conjunction with the latest World Polymer Congresses brought together representatives from Chemical and Polymer Societies from across the world and fostered scientific discussion and the exchange of ideas.

A booklet giving details of all World Polymer Organisations was prepared for the symposium by the Society of Polymer Science, Japan under the auspices of Division IV.

The **31 conferences sponsored** in 2003-5 and the **16 volumes of conference papers** published so far [1-16] in the same period represent attempts to foster communication between individual chemists.

The **5 educational courses, workshops and conferences** partially sponsored and supported by the Division and IUPAC (Project Committee) have been aimed specifically at reaching young chemical scientists from educationally hindered countries.

The development of a polymer-education web site and the new project (in conjunction with the CCE) on preparing educational material for French-speaking countries will also improve communication.

(e) Enhancement of Chemistry Education, Development of Young Scientists and Public Appreciation of Chemistry

As just stated under (d), the 5 educational courses, workshops and conferences partially sponsored and supported by the Division and IUPAC (Project Committee), the polymer-education web site and the new project for French-speaking countries were and are aimed at young chemical scientists from educationally hindered countries.

Students on one of the courses, the postgraduate course based in Prague, have published numerous papers in journals (publications [50-104]). The other workshops and conferences have led and will lead to material being issued as booklets and in electronic format, some of which will appear on the Division web site.

The IUPAC-Samsung Young-Scientist Award and Student Bursaries were presented at the 2004 World Polymer Congress. The first IUPAC-Samsung Education prize will be awarded in 2005. The first IUPAC Poster Prizes were presented at Polymer Networks 2004.

(f) Breadth of National Membership

Scientists involved with Division IV are spread worldwide. For example, the Division Committee, numbering 26, has members from 18 countries, the Sub-Committees on Macromolecular Terminology, Structure - Property Characterization of Commercial Polymers,and Modelling Polymerization Kinetics and Processes have members from 15, 17 and 12 countries, respectively.

III. Summary for 2003-5 of Levels of Work and Output in the Division's Areas of Activities

(The detailed lists of projects, sponsored conferences and publications are given in Section IV.)

Sub-Committee on Structure and Properties of Commercial Polymers (Co-ordinators R.S. Bailey and S.C. Kim):

3 projects completed this biennium
4 projects completed earlier and awaiting publication
2 continuing projects
3 new projects
5 feasibility studies for new projects
6 meetings (Ludwigshafen, Stonefield Castle (Scotland), Paris, Kyoto, Zürich, Beijing)
19 reports and papers published, in press, submitted or prepared for publication [21-39]

A comprehensive summary of the Division's work on the structure and properties of commercial polymers since 1963 is now available on the Sub-Committee web site.

Molecular Characterization of Polymers (Co-ordinator H. Pasch):

1 project completed
2 new projects (1 interdivisional)
3 submitted proposals for new projects
3 reports and papers published or in press [40-42]

Sub-Committee on Polymerisation Kinetics and Proceses(Co-ordinator M. Buback):

2 projects completed
2 projects continuing
2 new projects
1 meeting (Paris)
4 reports and papers published or in press [43-46]

Sub-Committee on Macromolecular Terminology (Chairman M. Hess, Secretary R.G. Jones)

2 projects completed
13 continuing projects (5 interdivisional)
4 new projects (2 interdivisional)
8 feasibility studies for new projects
2 meetings (Paris, Beijing)
2 recommendations published [47,48]
4 recommendations under ICTNS and public review

Developing Polymer Materials Systems (Co-ordinators: C. Ober, J. Vohlidal, W.J. Work)

1 project completed (on conducting polymer colloids)
Feasibility studies for new projects in the areas of new polymer-based materials, biopolymer materials and biodegradability.
1 report published [49]

Education (Co-ordinators J.-Il Jin, R.D. Sanderson, J.-P. Vairon)

1 UNESCO/IUPAC postgraduate course (Prague) completed (project)
1 new UNESCO/IUPAC postgraduate course (Prague) (project)
1 new characterisation course (Minho) (project)
1 new project on Educational Materials for French-Speaking Countries (joint with the CCE)

All the courses have led or will lead to the publication and distribution of educational materials. For the postgraduate course in Prague, numerous published papers have been an outcome (see publications [50-104]).

Financial support (via Project Committee) for UNESCO/IUPAC conferences in South Africa (2004) and Mauritius (2005) and for a conference in St. Petersburg (2005); all related to the IUPAC programme for disadvantaged countries.

IUPAC-Samsung Young-Scientist Award and Student Bursaries (2004) and IUPAC-Samsung Education Prize (2005) distributed.

Conference Sponsorship (Co-ordinators P. Kubisa and S. Penczek):

The Division has been active in seeking out conferences for IUPAC sponsorship. The following figures summarise the results of its activities (see Section IV for details of the conferences):
10 conferences sponsored in 2003
10 conferences sponsored in 2004
11 conferences sponsored to date for 2005
3 conferences are sponsored so far for 2006 and 1 conference for 2007

≈ 100% of the sponsored conferences result in journal or book publications of conference proceedings (see publications [1-16])
≈ 50% of the volumes of Macromolecular Symposia are proceedings from IUPAC sponsored conferences approved through Division IV

Polymer and Division Strategy (Co-ordinators K. Horie, J.-Il Jin)

The Polymer Summit is held biennially as part of World Polymer Congresses, and brings together representatives from Polymer Societies worldwide to discuss matters of strategic importance and future initiatives. A meeting was held in Paris, in 2004, as part the World Polymer Congress there and the next will be held in Rio de Janeiro in 2006.

To maintain a sense of world polymer community, a database and booklet of World Polymer Organizations is compiled, in conjunction with the Division, by The Society of Polymer Science, Japan. A new booklet was published in July, 2002.

Publications [7,17-20] have resulted the first IUPAC Strategic Conference on the Mission and Challenges of Polymer Science and Technology, held in December 2002 in Kyoto. The next strategic conference will be held in New York in 2007.

A project on the strategic study of world polymer science is underway.

R.F.T. Stepto
Manchester
1st August, 2005

IV. Collected Data

Projects

Structure and Properties of Commercial Polymers

Completed Projects

421/20/87 Characterisation of flow behaviour and properties of Liquid Crystal and Aromatic Polymers
Task Group Leader: J.L.S. White

421/31/93
Structure and Properties of Hydrogenated NBR
Task Group Leaders: T. Kobatake and T. Masuda

421/33/95
Rheological and Mechanical Properties of PαMSAN/PMMA Blends in Miscible and Phase Separated Regimes of Various Morphologies
Task Group Leaders: H.M. Laun, L. Lyngaae-Jörgensen and V. Altstädt

421/34/95
Property Improvement via Interfacial Chemical Reaction - Reactive Extrusion of EVOH/SMA and Polyamide/MAH-EPR
Task Group Leaders: J.E. Curry, J.G. Bonner, and P.S. Hope

421/35/97
Effects of Side-Chain Branching on Processability of Commercial Polycarbonates
Task Group Leaders: M. Takahashi, K. Sato, T. Masuda

1999-020-1-400
Quantifying scratch resistance of commercial polymers
Task Group Leader: R.S. Bailey

1999-039-1-400
Structure and Properties of Cyclic Olefin Copolymers
Task Group Leader: S.C. Kim

Continuing Projects

2002-052-1-400
Structure and Properties of polyester elastomers composed of poly(butylenes terephthalate) and poly(ε-caprolactone)
Task Group Leader: T. Takigawa

2003-009-1-400
Recommendations for data presentation, applicable to mechanical and rheological measurements of polymers.
Task Group Leader: E. Wassner

New Projects

2003-051-1-400
Structure and Properties of polymer/clay nano-composite materials.
Task Group Leader: S. C. Kim

2004-009-1-400
Guideline for rheological characterisation of polyamide melts.
Task Group Leader: D. Dijkstra

2003-038-4-400
Structure and Properties of Linear and Crosslinked Structural PVC Foams
Task Group Leader: V. Altstädt

Molecular Characterization of Polymers

Completed Project

1999-021-1-400
Round-Robin Test on the Molecular Characterization of Epoxy Resins by Liquid Chromatography
Task Group Leader: S. Podzimek

New Project

2003-023-2-400
Data treatment in size exclusion chromatography of polymers
Task Group Leader: G. R. Meira

New Interdivisional Project

IV/VI/VII
2004-022-3-400
Terminology and Measurement Techniques of Starch Components
Task Group Leader: M. Fitzgerald

Modelling of Polymerization Kinetics and Processes

Completed Projects

2000-001-1-400
Critically Evaluated Propagation Rate Ccoefficients for Free-Radical Polymerizations of Methacrylic Acid Esters with Functional, Cyclic and Branched Ester Groups
Task group Leader: Sabine Beuermann

2002-023-1-400
Critically Evaluated Propagation Rate Coefficients for Free-Radical Polymerizations: Acrylic Acid Alkyl Esters
Task group Leader: Robin Hutchinson

Continuing Projects

2000-028-1-400
Critically Evaluated termination Rate Coefficients for Free-Radical Polymerization
Task Group Leader: G.T. Russell

2002-053-1-400
Establishment of Quantitative Reliability of Electron Spin Resonance Techniques for Polymerization Kinetics
Task group Leader: B. Yamada

New Projects

2004-034-1-400
Critically Evaluated Propagation Rate Coefficients for Free-Radical Polymerization of Water-Soluble Monomers Polymerized in the Aqueous Phase
Task group Leader: I. Lacík

2004-040-1-400
Towards a Holistic Mechanistic Model for Reversible Addition Fragmentation Chain Transfer (Raft) Polymerizations: Dithiobenzoates as Mediating Agents
Task group Leader: P. Vana

Macromolecular Terminology and Nomenclature

Completed Projects

410/24/93
Terminology Related to Polymer Composites and Blends
Task Group Leaders: K. Horie, W.J. Work

1999-048-1-400
Definition of Terms Relating to Reactions of Polymers and Functional Polymers
Task Group Leader: K. Horie

Continuing Projects

410/22/93
Guide to Polymer Terminology and Macromolecular Nomenclature
Task Group Leader: E.S. Wilks

2000-006-1-400/2004-008-1-400
Terminology of Polymers Containing Ionizable Groups and Polymers Containing Ions
Task Group Leader: P. Kubisa

2000-014-1-400
Glossary of Class Names of Polymers Based on their Chemical Structure and Molecular Architecture
Task Group Leader: J. Vohlidal

2000-016-1-400
Terminology for the Kinetics, Thermodynamics and Mechanisms of Polymerizations
Task Group Leader: S. Penczek

2000-017-1-400
Polymerization Processes and Polymers in Dispersed Systems
Task Group Leader: S. Slomkowski

2002-006-2-400
Terminology for Radical Polymerizations with Minimal Termination – the so-called "Living" and "Controlled" Radical Polymerizations
Task Group Leaders: A.D. Jenkins, R.G. Gilbert, G. Moad

2002-048-1-400
Purple Book, 2nd Edition
Task Group Leader: E.S. Wilks

2003-021-1-400
Definitions of Terms Relating to Crystalline Polymers
Task Group Leader: G. Allegra

Continuing Interdivisional Projects

IV/II
2000-007-1-400
Glossary of Terms Relating to Polymeric Gels and Networks, Hybrid Inorganic Polymer Materials and the Processing thereof
Task Group Leaders: R.G. Jones, M. Hess

VIII/IV

1999-051-1-800
Source Based Nomenclature for Modified polymer Molecules
Task Group Leader: T. Kitayama

2000-037-1-800
Nomenclature for Macromolecular Rotaxanes
Task Group Leader: A. Yerin

2000-081-1-800
Terminology and Structure-Based Nomenclature of Dendritic and Hyperbranched Polymers
Task Group Leader: J. Kahovec

2000-082-1-800
Terminology and Nomenclature of Macromolecules with Cyclic Structures
Task Group Leader: W. Mormann

New Projects

2004-043-1-400
Terminology for Biomedical (Therapeutic) Polymers
Task Group Leader: M. Vert

2005-005-2-400
Definitions of Terms Relating to Individual Macromolecules, their Assemblies and Dilute Polymer Solutions
Task Group Leader:T. Chang

New Interdivisional Projects

IV/V

2003-060-2-400
Terminology for the Chromatographic Separation of Molecules
Task Group Leader: T. Chang

VIII/IV

2003-042-1-800
Source-Based nomenclature of Single-Strand Organic Polymers
Task group Leader: T. Kitayama

Developing Polymer Materials Systems

Completed Project

2002-019-1-400
Conducting Polymer Colloids and Nanofilms
Task Group Leader: J. Stejskal

Education

Completed Project

2002-047-1-400
UNESCO/IUPAC Postgraduate Course in Polymer Science
Task Group Leader: P. Kratochvíl

New Projects

2003-041-1-400
UNESCO/IUPAC Postgraduate Course in Polymer Science
Task Group Leader: P. Kratochvíl

2003-021-2-400
12th Annual Course on Polymer Characterization
Task Group Leader: A. Cunha

2004-037-1-400 **(with the support of CCE)**
Design of Polymer Education Material for French Speaking Countries
Task Group Leader: G. Froyer

Strategy

Continuing Project

2002-057-1-400
Strategic Study of World Polymer Science
Task Group Leader: M. Sawamoto

Conference Sponsorship

2003 (10 conferences)

11th International Conference on Polymer Characterization (POLYCHAR-11), Denton, Texas, USA, January 6-10, 2003

6th Annual UNESCO School/IUPAC Conference on Polymer Properties, Mpumalanga, South Africa, April 14-17, 2003

Xth International Symposium on Macromolecule Metal Complexes (MMC-X), Moscow, Russia, May 20-24, 2003

International Symposium on Ionic Polymerization, Boston, USA, June 30 - July 4, 2003

Degradation, Stabilization, and Recycling of Polymers, Prague, Czech Republic, July 14-17, 2003

Spectroscopy of Partially Ordered Macromolecular Systems, Prague, Czech Republic, July 21-24, 2003

17th Bratislava International Conference on Macromoleculaes. Molecular Characterization of Polymers, Bratislava, Slovakia, August 24-28, 2003

Interfaces and Interphases in Multicomponent Materials, Balatonfüred, Hungary, Oct 5-8, 2003

1st International Conference on Bio-based Polymers (ICBP 2003), Saitama, Japan, Nov 12-14, 2003

8th Pacific Polymer Conference, Bangkok, Thailand, Nov 24-27, 2003

2004 (10 conferences)

12th Annual Polychar World Forum on Advanced Materials, Guimaraes, Portugal, Jan. 5-9, 2004

7th Annual UNESCO School/IUPAC Conference on Polymer Properties, Stellenbosch, South Africa, April 5-8, 2004

8th World Conference on Biodegradable Polymers and Plastics, Seoul, Korea, June 1-4, 2004

2nd International Symposium on Macro- and Supramolecular Architectures and Materials (MAM-04), Missoula, MT, USA, June 13-17, 2004

World Polymer Congress 2004 - 40th IUPAC 40th Int. Symposium on Macromolecules, Paris, France, July 4-9, 2004

43rd PMM Microsymposium: Polymer Biomaterials; Biomimetic and Bioanalogous Systems, Prague, Czech Republic, July 12-15, 2004

11th International Conference on Polymers and Organic Chemistry, Prague, Czech Republic, July 18-23, 2004

Polymer Networks 2004, Bethesda, MD, USA, August 15-19, 2004

Biological Polyesters (ISBP2004), Beijing, China, August 22-28, 2004

5th International Symposium on Natural Polymers and Composites, Sao Pedro, Brazil, September 12-15, 2004

2005 (11 conferences)

Joint Meeting of the 8th European Symposium on Polymer Blends and Fillers 2005, Bruges, Belgium, May 9-12, 2005

8th Annual UNESCO School & IUPAC Conference on Macromolecules, Reduit, Mauritius, June 4-9, 2005

5th International Symposium on Molecular Mobility and Order in Polymer Systems, St. Petersburg, Russia, June 20-24, 2005

23rd Discussion Conference PMM, Current Trends in Polymeric Materials, Prague, Czech Republic, June 26-30, 2005

67th Prague Meeting on Macromolecules, Polymer Gels and Networks, Prague, Czech Republic, July10-14, 2005

ERPOS 10 – Electrical and Related Properties of Organic Solids and Polymers, Corsica, France, July 11-16, 2005

8th Society of Polymer Science, Japan International Polymer Conference (IPC 2005),Fukoka, Japan, July 26-29, 2005

8th International Symposium: Polymers for Advanced Technology, Budapest, Hungary, September 13-16, 2005

11th International Symposium on Macromolecule-Metal Complexes, Tirrenia, Italy, September18-22, 2005

15th International Symposium on Fine Chemistry and Functional Polymers (FCFP-XV), Shanghai, China, October 17-20, 2005

International Symposium on Ionic Polymerisations and Related Processes, Goa, India, October 23-28, 2005

2006

12th International Conference on Polymers and Organic Chemistry (POC'06), Okazaki, Japan, July 2-7, 2006

World Polymer Congress MACRO 2006, 41st IUPAC International Symposium on Macromolecules, Rio de Janeiro, Brazil, July 16-21, 2006

International Symposium on Radical Polymerisation Kinetics and Mechanism, Il Ciocco/Castelvecchio Pascoli, Italy, September 3-9, 2006

2007

Polymer Conference on the Mission & Challenges of Polymer Science and Technology II, New York, June, 2007

2008

World Polymer Congress MACRO 2008, 42nd IUPAC International Symposium on Macromolecules, China/Taipei, 2008 (provisional)

2010

World Polymer Congress MACRO 2010, 43rd IUPAC International Symposium on Macromolecules, Glasgow, U.K. (provisional)

Publications

Conference Publications

1. 10th International Symposium on Macromolecule-Metal Complexes
Moscow, Russia, May 20-24
ed. T. M. Birshtein
Macromol. Symp. **191**, 1-200 (2003)

2. 5th Annual School and IUPAC Conference on Macromolecules and Material Science, Stellenbosch, South Africa, March 2002
eds. H. Pasch, R. D. Sanderson
Macromol. Symp. **193**, 1-304 (2003)

3. 39th International Conference on Macromolecules-IUPAC World Polymer Congress (MACRO 2002), Beijing, China, July 2002
ed. M. Xu
Macromol. Symp. **195**, 1-327 (2003)

4. Metal and Metalloid Containing Macromolecules, Ottawa, Canada, August 10-15, 2003
ed. A.S. Abd-El-Aziz
Macromol. Symp. **196**, 1-353 (2003)

5. 7th World Conference on Biodegradable Polymers and Plastics, Tirenia, Pisa, Italy, June 4-8, 2002
eds. E. Chellini, R. Solaro
Macromol. Symp. **197**, 1-466 (2003)

6. 16th Polymer Network Group Meeting, Polymer Networks 2002, Autrans, France, 2-6 Sept. 2002
ed. E. Geissler
Macromol. Symp. **200**, 1-296 (2003)

7. Mission and Challenges of Polymer Science and Technology, Kyoyo, Japan, 2-5 Dec. 2002, *eds. K. Horie, A, Abe*
Macromol. Symp. **201**, 1-325 (2003)

8. Polymer-Solvent Complexes and Intercalates, 63rd Prague Macromolecular Meeting, Prague, Czech Republic, July 21-25, 2002
eds. J. Spevacek, J. Kahovec
Macromol. Symp. **203**, 1-338 (2003)

9. 10th International Symposium on Macromolecule-Metal Complexes, Moscow, Russia, May 18-23, 2003
eds. E. Karakhanov, A. Maksimov
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10. Electrical and Related Properties of Polymers and Other Related Solids, Prague, Czech Republic, July 14-18, 2002
ed. J. Kahovec
Macromol Symp. **212**, 1-580 (2004)

11. 6th Annual UNESCO School/IUPAC Conference on Polymer Properties, Mpumalanga, South Africa, April 14-17, 2003
eds. R.D. Sanderson, H. Pasch
Macromol. Symp. **214**, 1-379 (2004)

12. International Symposium on Ionic Polymerization, Boston, USA, June 30 - July 4, 2003
eds. J. W. Mays, R. F. Storey
Macromol. Symp. **215**, 1-383 (2004)

13. 8th Pacific Polymer Conference, Bangkok, Thailand, Nov 24-27, 2003
eds. S. Supaphol, S. Tantayanon
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14. Spectroscopy of Partially Ordered Macromolecular Systems, Prague, Czech Republic, July 21-24, 2003
ed. J, Kahovec
Macromol. Symp. **220**, 1-175 (2005)

15. 8th World Conference on Biodegradable Polymers and Plastics, Seoul, Korea, June 1-4, 2004
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16. 7th Annual UNESCO School/IUPAC Conference on Polymer Properties, Stellenbosch, South Africa, April 5-8, 2004
eds. R. D. Sanderson, H. Pasch
Macromol. Symp. **225**, 1-237 (2005)

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17. The Missions and Challenges of Polymer Science and Technology
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18. Molecular Structure and Dynamics of Proteins in Solution: Insights Derived from High Resolution NMR Approaches
D. A. Torchia, R. Ishima
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A. P. Plochocki
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22. Characterisation of Flow Behaviour and Properties of Liquid Crystal and Aromatic Polymers
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23. Blends Containing Core-Shell Impact Modifiers. Part 4: Fatigue Behaviour
C. B. Bucknall
Plastics Rubber & Composites **33**, 234-241 (2004)
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25. Structure and Properties of Hydrogenated Acrylonitrile-Butadiene Rubber (HNBR). Part I. Relation between Viscosity and Intermolecular Interaction in Dilute Solution States
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30. Characterisation and Rheological Properties of Three Polycarbonates with Side-Chain Branching
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33. Thermal Degradation Studies on Cyclic Olefin Copolymers
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T. Takigawa, D. Dijkstra and J. He
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40. Characterization of Polyamides 6, 11 and 12; Determination of Molecular Weight by Size Exclusion Chromatography
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(Publications arising from postgraduate courses in Prague, **projects 2002-047-1-400 & 2003-041-1-400**, over the period 2003-2005. Publications listed in alphabetical order of student authors, whose names are given in bold type)

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50. Modification of Poly(styrene-*alt*-maleic anhydride) with 1,3,4-Oxadiazole Units for Electroluminescent Devices
G. Aldea, D.*Výprachtický, V.Cimrová*
Macromol. Symp.**212**, 523-528 (2004)

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66. Polyamide Nanocomposites with Improved Toughness
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104. Cocrystallization Dynamics in Lamellar Systems of PEO/PEO and PEO/PEO-*b*-PPO-*b*-PEO Blends
J. Baldrian, M. Steinhart, A. Sikora, ***G. Todorova,*** *M. Kriechbaum, H. Amenitsch, S. Bernstorff*
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