

IUPAC MAROMOLECULAR DIVISION (IV)

Report to Council for 2001 - 2003

I. Highlights and Executive Summary

.. Following the IUPAC restructuring, the Division took the **opportunity to reorganise** so that the Associate and Titular Members all have defined, co-ordinating roles to play. This approach has functioned well and all areas of activity are moving forward with vigour.

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

Structure - Property Characterization of Commercial Polymers (Co-ordinator H.M. Laun)

Molecular Characterization of Polymers (Co-ordinator D. Berek)

Polymerization Kinetics Characterization (Co-ordinator M. Buback)

Subcommittee on Macromolecular Terminology (Co-ordinators M. Hess (Chairman) and M. Barón (Secretary))

Developing Polymer Materials Systems (Co-ordinators J. Vohlídal and W.J. Work)

Education (Co-ordinators J.-Il Jin, A.R. Khokhlov, D. Tabak)

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

Recruitment at Conferences (Co-ordinator R.G. Gilbert)

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

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

(The first five areas, Structure-Property Characterisation of Commercial Polymers to Developing Polymer Materials Systems closely reflect previous activities under the commissioned-based structure.)

A summary of the activities under the various areas according to the six goals of the current IUPAC Strategic Plan are given in Section II. More details are given in Section III and collected data (projects, conferences and publications) are listed in Section IV. Key points in terms of achievements and developments are given in this section.

.. The **Division web site** has been changed so that the new structure and activities can clearly be seen. The Division is also actively pursuing a policy of having all its reports and recommendations available on the web site.

.. The Division's work on the **Structure - Property Characterization of Commercial Polymers** continues to make a significant input in this vital industrial (and academic) area. The activity is the continuation and expansion of the work of Working Party IV.2.1.

It represents an enormous effort, involving 82 task group members from industry and academia in 19 countries, and a sizeable industrial investment in terms of facilities and manpower. The Division sees the work as a flagship activity

- .. The projects under the **Molecular Characterization of Polymers**, involving about 30 task group members, are beginning to result in publications. The work is presently based on evaluating and developing size-exclusion chromatography methods. The Division will be seeking to broaden the investigations to include other methods.
- .. The projects in the area of **Polymerization Kinetics Characterization** relate to the modeling and critical evaluation of rate coefficients of free-radical polymerizations of industrial relevance. About 40 task group members are involved and the resulting publications are highly valued in the field, as witnessed by the very high numbers of citations they receive.
- .. The formation of the **Subcommittee on Macromolecular Terminology** at Brisbane proved to be the right course of action to enable the momentum and range of activities of Commission IV.1 to continue. The Division saw it as important that the Subcommittee was formed in order that macromolecular terminology and nomenclature could continue to be developed in a collective fashion, both by round-table discussion and by email correspondence. The Subcommittee has 28 members and about 25 additional, active task-group members. It is presently bringing projects existing under Commission IV.1 to successful conclusions and launching feasibility studies for new projects. In addition, it collaborates actively with Division VIII on nomenclature projects, with the Chairman of the Subcommittee being a Titular Member of Division VIII.
- .. Following the successful operation of the Subcommittee on Macromolecular Terminology, the Division plans to launch **new Subcommittees** appropriate to other areas of activity. Thus, a **Subcommittee on the Structure - Property Characterization of Commercial Polymers** and a **Subcommittee on the Modeling of Polymerization Kinetics and Processes** will be launched during the General Assembly in Ottawa. Discussions are also taking place on whether to form Subcommittees on Molecular Characterization and Education.
- .. The area of activity **Developing Polymer Materials Systems** is a broadening of the remit of Commission IV.3 on Functional Polymers. It is a valuable area of work but it is still a relatively small effort with about 10 task group members involved in projects on conducting polymer materials. Plans to launch a major activity related to polymers linked with biomaterials are under discussion.
- .. The Division sees **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. During the biennium, the Division will have partially sponsored and supported **eight** educational courses and workshops and it has been grateful for the financial support received from COCI for one of the courses. In addition, there is increased cooperation with CCE and the significant participation of polymer scientists in their next conference in Istanbul in 2004 is planned.
- .. Linked with its work in **Education**, the Division is pleased to announce a \$125,000 endowment from the **Samsung General Chemicals Company of South Korea**. The

interest from the endowment will be used for awards, prizes and bursaries for educational courses and young scientists. Jung-II Jin, the Vice-President of the Division, was instrumental in obtaining the endowment.

- .. As with Education, the Division has taken a particular initiative regarding **Conference Sponsorship**. Largely through the efforts of the Co-ordinators for Conference Sponsorship and other Division Members, a total of 21 IUPAC-sponsored polymer conferences have been and will be held in 2002 and 2003. Every effort is being made to maintain this level during the coming biennium.

Eight conference volumes have resulted in 2002 and 2003 from this increased activity (see publications [1-8]). More than half of the issues of Macromolecular Symposia are presently devoted to IUPAC-sponsored conferences, representing a significant income to IUPAC. This year, for the first time, the journal was unable to accommodate all the IUPAC conferences it was offered.

The IUPAC World Polymer Congress of 2002, organised through the Division, was held in Beijing. It is generally recognised that the biennial IUPAC World Polymer Congress, with over 1000 participants, is the main event in the international polymer conference calendar.

- .. Active steps are being taken in **Recruitment at Conferences**. A Division Brochure has been prepared and 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** has been a new initiative of the present biennium. 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 Division helped to organise a very successful **Strategic Polymer Conference** in Kyoto in December 2002 and a second is planned for New York in 2005. It has also launched a strategic study of future developments in polymer science.

- .. **Future Plans and Structure**

Division IV will seek to form more subcommittees covering its project areas in order to give a more visible and coherent structure to its activities.

The Division proposes to maintain its existing project areas, Structure-Property Characterization, Molecular Characterization, Polymerization Characterization, Terminology, 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, it is intended, for the first time, that the coming elections to the Division Committee will be to positions designated for particular responsibilities.

II. Division Activities and the IUPAC Strategic Plan

(a) World Leadership

The Division has launched **Strategic Study** into the needs and direction of World Polymer Science (project 2002-057-1-400) and has helped to organise the first **Strategic Conference**, in Kyoto, December 2002, on the Mission and Challenges of Polymer Science and Technology. A keynote article of the same title as the conference is in press in Pure and Applied Chemistry (publication [9]). A second strategic conference is planned for June 2005 in New York.

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 2002 took place in Beijing, that in 2004 will take place in Paris and in 2006 the WPC will be in Rio de Janeiro.

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

The Division is active in several areas under this heading, as witnessed by its work on the Structure - Property Characterization of Commercial Polymers, the Molecular Characterization of Polymers, Polymerization Kinetics Characterisation and Developing Polymer Materials Systems, as well as the work of the Subcommittee on Macromolecular Terminology. Overall, 7 new projects have been launched and 17 other projects are active or have been running during 2001-2003. 36 reports and papers have been published or are in press (publications [10-45]). In addition, 12 meetings of task groups or collected task groups and 2 meetings of the Subcommittee on Macromolecular Terminology have been held.

(c) Assistance to Chemistry-Related Industry

The Division's work in the four areas of Structure - Property Characterization of Commercial Polymers, Molecular Characterization of Polymers, Polymerization Kinetics Characterisation 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 5 of the new projects, 6 of the active projects, 30 of the publications and the 12 meetings of task groups or collected task groups.

(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 **Polymer Summit** meetings, organised in conjunction with World Polymer Congresses bring together representatives from Chemical and Polymer Societies from across the world and foster scientific discussion and the exchange of ideas. A booklet giving details of all World Polymer Organisations is prepared for Polymer Summit meetings by the Society of Polymer Science, Japan under the auspices of Division IV.

The **21 conferences sponsored** in 2002-2003 and the **8 volumes of conference papers** published so far [1-8] in the same period represent attempts to foster communication between individual chemists.

The **8 educational courses and workshops** partially sponsored and supported by the Division have been aimed specifically at young chemical scientists from educationally hindered countries.

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

As just stated under (d), the 8 educational courses and workshops partially sponsored and supported by the Division are aimed at young chemical scientists from educationally hindered countries. They account for 1 new project, 1 planned new project and 4 active projects in the period 2001-2003.

Students on one of the courses, a postgraduate course based in Prague, have published 13 papers in journals (publications [46-58]). Other courses and workshops have led to material being issued as booklets and the IUPAC project on University Education in Polymer Science (based in Moscow) has led to the electronic publication of educational material, some of which will appear on the Division web site.

(f) Breadth of National Membership

Scientists involved with Division IV are spread worldwide. For example, the Division Committee has members from 19 countries, the Subcommittee on Macromolecular Terminology 17 countries, the Task Groups on Structure - Property Characterization of Commercial Polymers 19 countries and those on Polymerization Kinetics Characterisation have members from 10 countries.

III. Summary for 2001-2003 of Level of Work and Outputs in the Division's Various Areas of Activities

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

Structure - Property Characterization of Commercial Polymers (Co-ordinator H.M. Laun):

(The work in this area was formerly under the auspices of Working party IV.2.1. On the change to a project-driven system, the Working Party made a particular effort to complete all its outstanding projects.)

- 11 completed projects
- 2 continuing projects
- 2 new projects
- 5 feasibility studies for new projects
- 6 meetings of collected tasks groups (Karlsruhe, Naha (Japan), London (Canada), Beijing, Ludwigshafen, Stonefield Castle (Scotland))
- 24 reports and papers published, in press, submitted or prepared for publication [10-33]

In addition, a comprehensive summary of work in this area entitled "Working Party IV.2.1 'Structure and Properties of Commercial Polymers' – History, Output and Future Prospects has been prepared and is under review by the Division.

Molecular Characterization of Polymers (Co-ordinator D. Berek):

(The work in this area was formerly under the auspices of Working Party IV.2.2.)

- 1 project completed
- 1 project continuing
- 1 feasibility study for a new project
- 2 meetings of collected task groups (Bratislava, Leoben (Austria))
- 2 reports and papers published or in press [34,35]

Polymerization Kinetics Characterization (Co-ordinator M. Buback):

(The work in this area was formerly under the auspices of Working Party IV.2.8.)

- 1 project completed
- 1 project continuing
- 2 new projects
- 4 meetings of task groups (Il Ciocco (Italy), Boston (USA) (twice), Quebec City)
- 3 reports and papers published or in press [36-38]

Subcommittee on Macromolecular Terminology (Chairman M. Hess, Secretary M. Barón)
(The work in this area was formerly under the auspices of Commission IV.1.)

- 5 projects completed
- 6 continuing projects
- 4 projects transferred to Division VIII as joint projects
- 2 new projects
- 4 feasibility studies for new projects
- 2 Subcommittee Meetings (Beijing, Ottawa)
- 6 recommendations published or in press [39-44]
- 1 recommendation under ICTNS and public review

Developing Polymer Materials Systems (Co-ordinators: J. Vohlidal and W.J. Work)
(This area of work is an expansion of that formerly carried out under the auspices of Commission IV.3 on Functional Polymers.)

- 1 project completed (on conducting polymer colloids)
- 1 new project launched (conducting polymer colloids)
- 1 feasibility study for new projects in the areas of biopolymer materials and biodegradability.
- 1 report published [45]

Education (Co-ordinators J.-Il Jin, A.R. Khokhlov and D. Tabak)

- 1 UNESCO/IUPAC postgraduate course (Prague) completed (project)
- 1 project on University Education in Polymer Science (Moscow) completed
- 2 characterisation courses (Denton (USA)) completed (projects)
- 1 UNESCO/IUPAC course (Stellenbosch (RSA)) completed
- 1 new UNESCO/IUPAC postgraduate course (Prague) (project)
- 1 new characterisation course (Minho) planned (project)
- 1 new joint UNESCO/IUPAC course (Stellenbosch (RSA)) planned

All the courses have led to the publication and distribution of educational materials. In the postgraduate course, published papers have been an outcome (see publications [46-58]). The project based in Moscow will lead to educational material being posted on web sites, including the IUPAC web site.

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

The Division has been active in seeking out conferences for IUPAC sponsorship and, in this initiative, the help of the Secretariat in reducing the lead time for obtaining sponsorship is much appreciated. The following figures summarise the results of its activities (see Section IV for details of the conferences):

- 11 conferences sponsored in 2002 (9 in 2001 and 6 in 2000)
- 10 conferences are sponsored to date for 2003
- 4 conferences are sponsored so far for 2004 and 1 conference for 2005

≈ 100% of the sponsored conferences result in journal or book publications of conference proceedings (publications [1-8])

≈ 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, Wang Fosong)

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 Beijing, in 2002, as part the World Polymer Congress there and the next will be held in Paris in 2004.

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.

The first IUPAC Strategic Conference on the Mission and Challenges of Polymer Science and Technology was held in December 2002 in Kyoto. The next will be held in New York in 2005.

A new project on the strategic study of world polymer science has been launched.

R.F.T. Stepto
Manchester
June, 2003

IV. Collected Data

Projects

Structure –Property Characterization of Commercial Polymers

Completed Projects

421/15/86 Melt Rheology and Concomitant Morphology in Polyblends and Polyalloys
Task Group Leader: A.P. Plochocki

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

421/28/89 Structure-Property Relationship of Discontinuous Fibre Reinforced Plastics
Task Group Leaders: M. Bevis, A. Cervenka, and W. Gleissle

421/29/91 Rubber Toughening of Plastics
Task Group Leaders: C.B. Bucknall and M. Kozlowski
Completion Date: 2001

421/30/93
The Influence of Reprocessing on the Structure-Property Characteristics of a Plasticised PVC Compound
Task Group Leaders: D. R. Moore and C. Dehennau

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

421/32/95
Future Requirements in the Characterisation of Continuous Fibre Reinforced Polymeric Composites
Task Group Leaders: D.R. Moore and A. Cervenka

421/33/95
Rheological and Mechanical Properties of P α MSAN/PMMA Blends in Miscible and Phase Separated Regimes of Various Morphologies
Task Group Leaders: H.M. Laun, L. Lyngaae-Jørgensen 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

421/36/97

Studies on Biodegradable Poly(e-caprolactone).

Task Group Leaders: M. Hirami, M. Mochizuki, T. Hayashi

Continuing Projects

1999-020-1-400

Quantifying scratch resistance of commercial polymers

Task Group Leader: R. Bailey

1999-039-1-400

Structure and Properties of Cyclic Olefin Copolymers

Task Group Leader: S.C. Kim

New Projects

2002-052-1-400

Structure and Properties of polyester elastomers composed of poly(butylenes terephthalate) and poly(e-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

Molecular Characterization of Polymers

Completed Project

422/6/98

Characterization of Polyamides using Size Exclusion Chromatography

Task group Leader: E.C. Robert

Continuing Project

1999-021-1-400

Round-Robin Test on the Molecular Characterization of Epoxy Resins by Liquid Chromatography

Task group Leader: S. Podzimek

Polymerization Kinetics Characterization

Completed Project

2000-001-1-400

Critically Evaluated Propagation Rate Coefficients for Free-Radical Polymerizations of Methacrylic Acid Esters with Functional, Cyclic and Branched Ester Groups

Task group Leader: S. Beuermann

Continuing Project

2000-028-1-400

Critically Evaluated termination Rate Coefficients for Free-Radical Polymerization

Task Group Leader: G.T. Russell

New Projects

2002-023-1-400

Critically Evaluated Propagation Rate Coefficients for Free-Radical Polymerizations: Acrylic Acid Alkyl Esters

Task Group Leader: R. Hutchinson

2002-053-1-400

Establishment of Quantitative Reliability of Electron Spin Resonance Techniques for Polymerization Kinetics

Task group Leader: B. Yamada

Macromolecular Terminology and Nomenclature

Completed Projects

410/18/87

Definition of Basic Terms Relating to Low-Molar-Mass and Polymer Liquid-Crystals

Task Group Leaders: M. Barón and R.F.T. Stepto

410/19/89

Revision of Nomenclature for Regular Single-Strand Organic Polymers

Task Group Leader: J. Kahovec

410/21/93

Generic Source-Based Nomenclature for Polymers

Task Group Leaders: E. Maréchal and I. Mita

410/24/93

Terminology Related to Polymer Composites and Blends

Task Group Leaders: K. Horie and W.J. Work

410/25/93

Definition of Terms Relating to Stereochemically Asymmetric Polymerizations

Task Group Leaders: T. Kitayama and K. Hatada

Continuing Projects

1999-048-1-400

Definition of Terms Relating to Reactions of Polymers and Functional Polymers

Task Group Leader: K. Horie

2000-006-1-400

Terminology of Polymers Containing Ionizable Groups and Polymers Containing Ions

Task Group Leader: P. Kubisa

2000-007-1-400

Glossary of Terms Relating to Polymeric Gels and Networks, Hybrid Inorganic Polymer Materials and the Processing thereof

Task Group Leader: R.G. Jones

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

Continuing Joint Division VIII Projects

1999-051-1-800

Source Based Nomenclature for Modified polymer Molecules

Task Group Leader: E.S. Wilks

2000-037-1-800

Nomenclature for Macromolecular Rotaxanes

Task Group Leader: E.S. Wilks

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

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 and G. Moad

2003-021-1-400

Definitions of Terms Relating to Crystalline Polymers

Task Group Leader: G. Allegra

Developing Polymer Materials Systems

Completed Project

1999-024-1-400

Polyaniline: the Preparation of a Conducting Polymer

Task Group Leader: J. Stejskal

New Project

2002-019-1-400

Conducting Polymer Colloids and Nanofilms

Task Group Leader: J. Stejskal

Education

Completed Projects

1999-029-1-400

UNESCO/IUPAC Postgraduate Course in Polymer Science

Task Group Leader: P. Kratochvíl

2000-005-1-400

University Education in Polymer Science

Task Group Leader: A.R. Khokhlov

2001-065-1-400

10th Annual Course on Polymer Characterization

Task Group Leader: W. Brostow

2002-027-1-400

11th Annual Course on Polymer Characterization

Task Group Leader: W. Brostow

New Project

2002-047-1-400

UNESCO/IUPAC Postgraduate Course in Polymer Science

Task Group Leader: P. Kratochvíl

Strategy

New Project

2002-057-1-400

Strategic Study of World Polymer Science

Task Group Leader: M. Sawamoto

Conferences Sponsored

2002

10th International Conference on Polymer Characterization (POLYCHAR-10), Denton, Texas, USA, January 7-11

5th Annual South African UNESCO School/IUPAC Conference on Macromolecules and Materials Science, Stellenbosch, South Africa, March 23-28

4th International Symposium on Molecular Order and Mobility in Polymer Systems, St. Petersburg, Russia, June 3-7

7th World Conference on Biodegradable Polymers and Plastics, Tirrenia (Pisa), Italy, June 4-8

World Polymer Congress 2002 - 39th IUPAC International Symposium On Macromolecules, Beijing, China, July 7-12

Polymers and Organic Chemistry 2002, San Diego, CA, USA, July 14-18

21st Discussion Conference: Electronically Active Polymers, Prague, Czech Rep., July 15-18

Macro Group UK International Conference on Polymer Synthesis, Coventry, UK, July 29 - August 1

Polymer Networks 2002, Autrans, France, September 2-6

Macromolecules in the 21st Century, Vienna, Austria, October 7-9

IUPAC Polymer Conference on the Mission and Challenges of Polymer Science and Technology, Kyoto, Japan, December 2-5

2003

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 Macromolecules. 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

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

18th International Conference on Chemical Education, Istanbul, Turkey, August 3-8, 2004

2005

Polymer Conference on the Mission & Challenges of Polymer Science and Technology, New York, June, 2005

Publications

Conference Publications

1. 15th Bratislava International Conference on Polymers, Bratislava, Non-Conventional Polymer Dispersions, Slovakia, 2001
ed. I. Capek
Macromol. Symp. **179**, 1-358 (2002)
2. 3rd IUPAC International Conference on Free-Radical Polymerization. Kinetics and Mechanism, Lucca, Italy, June 2001
eds. M. Buback and A. L. German
Macromol. Symp. **182**, 1-303 (2002)
3. IUPAC International Symposium on Ionic Polymerization, Crete, Greece, July 2001
eds. N. Hadjichristidis and H. Iatrou
Macromol. Symp. **183**, 1-210 (2001)
4. 8th IUPAC International Symposium on Macromolecule-Metal Complexes (MMC-9), New York, August 2001
eds. K. Levon and A. Guiseppi –Elie
Macromol. Symp. **186**, 1-185 (2002)
5. 41st Microsymposium of the Prague Meetings on Macromolecules, Polymer Membranes, July 2001
ed. J. Kahovec
Macromol. Symp. **188**, 1-164 (2002)
6. 6th Brazilian Polymer Conference, Polymer Science Insights, Gramado, Brasil, November 2001
ed. M. A. De Paoli
Macromol. Symp. **189**, 1-141 (2002)
7. 20th Discussion Conference of the Prague Meetings on Macromolecules, Scattering Methods for the Investigations of Polymers, Prague, July 2001
ed. J. Kahovec
Macromol. Symp. **190**, 1-199 (2002)
8. 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)

Strategy

9. The Missions and Challenges of Polymer Science and Technology
R.F.T. Stepto, K. Horie, T. Kitayama and A. Abe
Pure and Applied Chemistry 2003, *in press*

Structure –Property Characterization of Commercial Polymers

10. Melt rheology and concomitant morphology of a model binary mixture of polyethylene and polystyrene (polyblend)
A.P. Plochocki
Pure and Applied Chemistry, *manuscript prepared 2003*
(Project 421/15/86)
11. The rheological properties and associated structural characteristics of some aromatic polycondensates including liquid crystalline polyesters and cellulose derivatives
J. L. S. White, L. Dong and P. Han
Pure and Applied Chemistry, *submitted 2001*
(Project 421/20/87)
12. Characterisation of finite length fibre composites: Part VII. Rheological studies of processed polypropylene-glass composites
W. Gleissle
Polymer Engg. Sci. **18**, 20-32 (2003)
(Project 421/28/89)
13. Blends Containing Core-Shell Impact Modifiers. Part 1: Structure and Tensile Deformation Mechanisms
C. B. Bucknall
Pure and Applied Chemistry **73**, 897-912 (2001)
(Project 421/29/91)
14. Blends Containing Core-Shell Impact Modifiers. Part 2: Melt Rheology of Rubber-Toughened Plastics
M. Kozłowski and C. B. Bucknall
Pure and Applied Chemistry **73**, 913-926 (2001)
(Project 421/29/91)
15. Blends Containing Core-Shell Impact Modifiers. Part 3: Effects of temperature on tensile impact behaviour
C. B. Bucknall and G. Ajroldi
Plastics Rubber & Composites **30**, 377-383 (2001)
(Project 421/29/91)
16. Blends Containing Core-Shell Impact Modifiers. Part 4: Fatigue behaviour
C. B. Bucknall
Plastics Rubber & Composites, *manuscript prepared 2003*
(Project 421/29/91)
17. Blends Containing Core-Shell Impact Modifiers. Part 5: Fracture in dart-drop and notched bending tests
C. B. Bucknall
Plastics Rubber & Composites, *manuscript prepared 2003*
(Project 421/29/91)

18. Structure and Properties of Hydrogenated Acrylonitrile-Butadiene Rubber (HNBR). Part I. Relation between Viscosity and Intermolecular Interaction in Dilute Solution States
T. Kobatake, A. Yoshioka, K. Nakayama, J. He, Y. Aoki, T. Masuda
Pure and Applied Chemistry, *manuscript prepared 2002*
(Project # 421/31/93)
19. Structure and Properties of Hydrogenated Acrylonitrile-Butadiene Rubber (HNBR). Part II. Relation between Viscosity and Intermolecular Interaction in Condensed States
T. Kobatake, A. Yoshioka, K. Nakayama, J. He, Y. Aoki, T. Masuda
Pure and Applied Chemistry, *manuscript prepared 2002*
(Project 421/31/93)
20. Future Requirements in the Characterisation of Continuous Fibre Reinforced Polymeric Composites
D. R. Moore and A. Cervenka
Pure and Applied Chemistry **74**, 601-628 (2002)
(Project 421/32/95)
21. Rheology and morphology of phase-separating polymer blends
Z.I. Zhang, H.D. Zhang, Y.L. Yang, I. Vinckier and H.M. Laun
Macromolecules **34**, 1416-1429 (2001)
(Project 421/33/95)
22. Compatibility of poly(α -methylstyrene-co-acrylonitrile) with PMMA. A neutron and cloud point study
D. W. Schubert
Mat. Res. Innovat. **4**, 353-359 (2001)
(Project # 421/33/95)
23. Assessment of the Doi-Ohta theory for co-continuous blends under oscillatory flow
I. Vinckier and H.M. Laun
J. Rheol. **45**, 1373-1385 (2001)
(Project 421/33/95)
24. Interfacial tension in a LCST blend: Effect of temperature, blend composition and deformation of the interphase
I. Vinckier, T. Schweizer and H. M. Laun
J. Polym. Sci. Part B **40**, 679-690 (2002)
(Project 421/33/95)
25. Consistent analysis of cloud points and spinodal - compatibility of P(aMS -co-AN) and P(MA-co-MMA)
F. Havermeier and D. W. Schubert
Mat. Res. Innovat. **6**, 185 - 188 (2002)
(Project 421/33/95)
26. The role of pressure and dissipative heating in capillary rheometry of polymer melts
H. M. Laun
Rheol. Acta 2002, *in press*
(Project 421/33/95)

27. Rheological and mechanical properties of poly(α -methylstyrene-co-acrylonitrile)/poly(methylmethacrylate) blends in miscible and phase separated regimes of various morphologies. Part 4. Influence of the morphology on the mechanical properties
V. Altstädt, L. de Lucca Freitas and D. W. Schubert
Pure and Applied Chemistry, *submitted 2002*
(Project 421/33/95)
28. Property improvement via interfacial chemical reaction - Reactive extrusion of polyamide 12 and maleic anhydride grafted ethylene propylene copolymer rubber
J. E. Curry, P. S. Hope and J. G. Bonner
Pure and Applied Chemistry 2001, *in press*
(Project 421/34/95)
29. Characterisation and rheological properties of three polycarbonates with side-chain branching
M. Takahashi, K. Sato, P. Tas, J. He, M. Lecomte and T. Masuda
Pure and Applied Chemistry, *manuscript prepared 2002*
(Project 421/35/97)
30. Processability and mechanical properties of three polycarbonates with side-chain branching
M. Takahashi, K. Sakai, K. Sato, J. He, P. Tas and T. Masuda
Pure and Applied Chemistry, *manuscript prepared 2002*
(Project 421/35/97)
31. Studies on biodegradable poly(hexano-6-lactone) fibres. Part 3. Enzymatic degradation in vitro
T. Hayashi, K. Nakayama, M. Moshizuki and T. Masuda
Pure and Applied Chemistry **74**, 869-880 (2002)
(Project 421/36/97)
32. Chemical Structure and Physical Properties of Cyclic Olefin Copolymers
J. Y. Shin, J. Y. Park, C. Liu, J. He and S. C. Kim
Pure and Applied Chemistry, *submitted 2003*
(Project 1999-039-1-400)
33. Thermal Degradation Studies on Cyclic Olefin Copolymers
C. Liu, J. Yu, X. Sun, J. Zhang and J. He
J. Polymer Degradation and Stability, *submitted 2003*
(Project 1999-039-1-400)

Molecular Characterization of Polymers

34. Characterization of Polyamides 6, 11 and 12; Determination of Molecular Weight by Size Exclusion Chromatography
E.C. Robert, R. Bruessau, J. Dubois, B. Jacques, N. Meijerink, T.Q. Nguyen, D.E. Niehaus and W.A. Tobisch
Pure and Applied Chemistry, *in press*
(Project 422/6/98)
35. Repeatability and Apparent Reproducibility of Molar Mass Values for Commercial Polymers Determined with Size Exclusion Chromatography
D. Berek, R. Bruessau, D. Lilge, I. Mingozi, S. Podzimek, E. Robert
Proc. 16th International Bratislava Meeting on Polymers, Coupled, Hyphenated and Multidimensional Liquid Chromatographic Procedures for Separation of Macromolecules, Bratislava, September 9 - 13, 2001, p. 57.
(Project 1999-021-1-400)

Polymerization Kinetics Characterization

36. Critically Evaluated Propagation Rate Coefficients in Free-Radical Polymerizations – III. Methacrylates with Cyclic Ester Groups
S. Beuermann
Pure and Applied Chemistry, *in press*
(Project 2000-001-1-400)
37. Critically Evaluated Rate Coefficients for Free-Radical Polymerization 4: Propagation Rate Coefficients for Methacrylates with Cyclic Ester Groups
S. Beuermann, M. Buback, T.P. Davis, N. García, R.G. Gilbert, R.A. Hutchinson, A. Kajiwara, M. Kamachi, I. Lacík and G.T. Russell
Macromol. Chem. Phys. **204**, 1138-1150 (2003)
(Project 2000-001-1-400)
38. Critically Evaluated Termination Rate Coefficients for Free-Radical Polymerization
M. Buback, M. Egorov, V. Kaminsky, O.F. Olaj, G.T. Russell, P. Vana, G. Zifferer
Macromol. Chem. Phys. **203**, 2570-2582 (2002)
(Project 2000-028-1-400)

Macromolecular Terminology and Nomenclature

39. Definitions of Basic Terms Relating to Low-Molar-Mass and Polymer Liquid Crystals
C. Nožl, V.P. Shibaev, M. Barón, M. Hess, A.D. Jenkins, Jung-Il Jin, A. Sirigu, R.F.T. Stepto and W.J. Work
Pure and Applied Chemistry **73**, 845-895 (2001)
(Project 410/18/87)
40. Generic Source-Based Nomenclature for Polymers
R.E. Bareiss, R.B. Fox, K. Hatada, K. Horie, A.D. Jenkins, J. Kahovec, P. Kubisa, E. Maréchal, I. Meisel, W.V. Metanowski, I. Mita, R.F.T. Stepto and E.S. Wilks
Pure and Applied Chemistry **73**, 1511-1519 (2001)
(Project 410/21/93)
41. Definitions of Basic Terms Relating to Polymer Liquid Crystals
C. Nožl, V.P. Shibaev, M. Barón, M. Hess, A.D. Jenkins, Jung-Il Jin, A. Sirigu, R.F.T. Stepto and W.J. Work
Pure and Applied Chemistry **74**, 493-509 (2002)
(Project 410/18/87)
42. Definitions Relating to Stereochemically Asymmetric Polymerizations
K. Hatada, J. Kahovec, M. Barón, K. Horie, T. Kitayama, P. Kubisa, G.P. Moss, R.F.T. Stepto and E.S. Wilks
Pure and Applied Chemistry **74**, 915-922 (2002)
(Project 410/25/93)
43. Definitions of Terms Related to Polymer Blends, Composites and Multiphase Polymeric Materials
W.J. Work, K. Horie, M. Hess and R.F.T. Stepto
Pure and Applied Chemistry, *in press*
(Project 410/24/93)
44. Nomenclature of Regular Single-Strand Organic Polymers
J. Kahovec, R.B. Fox and K. Hatada
Pure and Applied Chemistry **74**, 1921-1956 (2002)
(Project 410/19/89)

Developing Polymer Materials Systems

45. Polyaniline: the Preparation of a Conducting Polymer
J. Stejskal and R.G. Gilbert
Pure and Applied Chemistry **74**, 857-867 (2002) (summary in Chem. Intl. **24**, 26 (2002))
(Project 1999-024-1-400)

Education (students names are given in bold type)

46. Modification of poly(styrene-*alt*-maleic anhydride) with 1,3,4-oxadiazole units for electroluminescent devices
G. Aldea, *D. Výprachtický and V. Cimrová*
Macromol. Symp., *in press*
(Project 1999-029-1-400)
47. Non-linear behaviour of PEO during crystallization and melting
A. Sikora, V.B. Dolgoshey, J. Baldrian and J. Kratochvíl
Proc. 4th Czech-Korean Joint Symposium on Macromolecular Chemistry, Prague 2002, p. 25
(Project 1999-029-1-400)
48. Polyaniline and polypyrrole prepared in the presence of surfactants: A comparative conductivity study
J. Stejskal, M. Omastová, S. Fedorova, J. Prokeš and M. Trchová
Polymer **44**, 1353-1358 (2003)
(Project 1999-029-1-400)
49. Surface polymerization of aniline on silica gel
J. Stejskal, M. Trchová, S. Fedorova, I. Sapurina and J. Zemek
Langmuir **19**, 3013-3018 (2003)
(Project 1999-029-1-400)
50. Surface and precipitation polymerization of aniline
S. Fedorova and J. Stejskal
Langmuir **18**, 5630-5632 (2002)
(Project 1999-029-1-400)
51. Polyaniline nanofilms produced by surface polymerization of aniline
S. Fedorova, I. Sapurina and J. Stejskal
21st Discussion Conference 'Electrical and Related Properties of Polymers and Other Organic Solids', Prague 2002, Abstracts, P60
(Project 1999-029-1-400)
52. Influence of properties and morphology of elastomeric phase on the behaviour of ternary reactive blends Nylon 6/rigid polymer/elastomer
I. Kelnar, J. Kotek, B.S. Munteanu and I. Fortelný
J. Appl. Polymer Sci., *in press*
(Project 1999-029-1-400)
53. Ternary reactive blend of poly(butylene terephthalate); synergistic effect of finely dispersed rigid polymer and elastomer
I. Kelnar, J. Kotek, B.S. Munteanu and I. Fortelný
IUPAC World Polymer Congress, 39th International Symposium on Macromolecules, Beijing 2002, Preprints 2, p. 548
(Project 1999-029-1-400)

54. Effect of reaction parameters on the particle size in the dispersion polymerization of 2-hydroxyethyl and glycidyl methacrylate in the presence of ferrofluid
D. Horák, N. Semenyuk and F. Lednický
J. Polym. Sci., Part A: Polym. Chem., *in press*
(Project 1999-029-1-400)
55. The deposition of multilayer proteinaceous coating on PET (in Russian)
A. Solovyev, E. Brynda, M. Houska, M. Bleha and L. Shataeva
Vysokomol. Soed., *submitted*
(Project 1999-029-1-400)
56. CocrySTALLIZATION behaviour of low-molecular-weight PEO fractions in polymer blends
J. Baldrian, M. Steinhart, A. Sikora, G. Todorova and H. Amenitsch
Proc. 4th Czech-Korean Joint Symposium on Macromolecular Chemistry, Prague 2002,
p. 22
(Project 1999-029-1-400)
57. Real-time SAXS and DSC study of structure development in crystalline polymer blends
J. Baldrian, M. Steinhart, A. Sikora, H. Amenitsch, S. Bernstorff, G. Todorova
Proc. 12th International Conference on Small-Angle Scattering, Venice 2002, p. 139
(Project 1999-029-1-400)
58. SAXS and DSC study of cocrySTALLIZATION of low-molecular PEO fractions in polymer blends
J. Baldrian, M. Horký, M. Steinhart, A. Sikora, M. Mihailova, H. Amenitsch, S. Bernstorff, G. Todorova
Proc. SPIE Int. Soc. Opt. Engg., *accepted*
(Project 1999-029-1-400)