

IUPAC POLYMER DIVISION MEETING

July 4 – 5, 2014

09:00–17:30

09:00–12:30

Hotel Meridien, Chiang Mai, Thailand

Those attending: Rameshwar **Adhikari** (Nepal), Ray **Boucher** (UK, Wiley), Michael **Buback** – Division President (Germany), Chin Han **Chan** (Malaysia), Suwalon **Chirachanchai** (Thailand) guest, Stephen **Clarke** (Australia) guest, Claudio **dos Santos** (Brazil), Jiasong **He** (China), Michael **Hess** – Division Secretary (Germany), Roger **Hiorns** (France), Robin **Hutchinson** (Canada), Jung-Il **Jin** (Korea), Igor **Lacik** (Slovakia), Do-sung **Lee** (Korea), Christine **Luscombe** (USA), Mario **Malinconico** (Italy), Valdo **Meille** (Italy), Graeme **Moad** (Australia), Robert **Molloy** (Thailand) guest, Werner **Mormann** (Germany), Christopher **Ober** – Division Past President (USA), Greg **Russell** – Division Vice-President (New Zealand), Sebastien **Perrier** (Aus) guest, Malcolm **Purbrick** (UK), Mitsuo **Sawamoto** (Japan), Stanislaw **Slomkowski** (Poland), Jaroslav **Stejskal** (Czech Republic), Natalie **Stingelin** (UK), Supavan **Tantayanon** (Thailand) guest, Miroslava **Trchová** (Czech Republic), Jean-Pierre **Vairon** (France), Michel **Vert** (France), Michael **Walter** (USA), Yusuf **Yagci** (Turkey)

Friday, 04.06.2014

1. President's Introductory Remarks and Finalization of the Agenda

Michael Buback welcomed the Division members and observers. The previously distributed meeting agenda was briefly discussed and accepted, in-process changes applied (see Appendix 1).

2. Apologies for Absence

Absent members sent their apologies together with greetings to the Division.

3. Approval of the Minutes of the Division Committee Meeting, Istanbul, August 2013

The minutes recorded from the 2013 meeting in Istanbul, Turkey, were accepted with no dissenting vote.

4. Matters Arising

Suggestions for candidates for the next Vice President and Division Secretary should be forwarded to Greg Russell as soon as possible. Somehow Mario Malinconico's nomination as NR was not forwarded, nevertheless he was welcomed as a 'honorary NR' since the number of NRs is restricted to only ten. The Division President stressed the importance of reports to the President in order to understand the progress of work in our Division. The future development of the Division should always be kept in view. The budget situation is dense after a 12% reduction for the biennium 2014-2015. Almost 100% of the budget goes into projects. Michael Buback reminded the Division members to react on the questionnaire concerning the website. The Vice-President is supposed to collect the comments, at least he should receive a copy. It was stressed that the website should be easily accessible and should provide access to all publications of the Division. Chris Ober mentioned that the website also contains information on IUPAC and on matters which are important for internal IUPAC work. The response to the Secretariat should be given on behalf of the entire PD committee rather than by individuals in parts. Claudio dos Santos mentioned the problem of hosting the *multilingual dictionary*, which is still on the server of his university but should be hosted by IUPAC.

5. Report Interdivisional Subcommittee Materials Chemistry (ISMC) (Chris Ober)

The Division cooperates with ISMC in existing SPT-projects and broadens funded projects, such as the Materials Chemistry Website, and helps to organize conferences. The Inorganic Division, the Physical Chemistry Division, Chris Ober, Dick Jones, Christine Luscombe etc. are involved. Those who are interested in a cooperation and have suggestions for projects or are interested in materials are invited to join. The Budget Committee could provide money for cooperations. Contacts should be made via Chris Ober.

6. Report Subcommittee Polymer Terminology - SPT (Roger Hiorns)

Roger Hiorns introduced Christine Luscombe as the secretary of SPT and expresses his thanks for her great job done for the organization of the meeting in Chiang Mai. With Jiazhong Chen being established as member of the SPT with excellent expertise in nomenclature now ALL nomenclature documents have to be reviewed by Karl-Heinz Hellwich und Jiazhong Chen prior to submission. SPT plans to install a board (the proper term and consistency with IUPAC rule has to be approved) consisting at present of the following members: Jiri Vohlidal, Dick Jones, Greg Russell, Christine Luscombe as secretary and Claudio dos Santos as deputy secretary. The purpose of this 'board' is purely administrative and intends to facilitate administrative processes (such as supporting projects, defining the agenda of future meetings, forwarding electronic communication within SPT

etc.). Jung-II Jin made the point that there is no such board defined by IUPAC and it might be a problem to establish this officially. The secure information exchange, the forum 'REDMINE' has been established on the server of the University of Pau (contact Roger Hiorns).

Publications since Istanbul: The Purple Book is now freely available on the internet and can be downloaded as pdf-file from http://www.iupac.org/fileadmin/user_upload/publications/e-resources/ONLINE-IUPAC-PB2-Online-June2014.pdf

2006-004-1-400 *Abbreviations* – (He, Tabak) published as, 'Abbreviations of polymer names and guidelines for abbreviating polymer names (IUPAC Recommendations 2014)', J. He, J. Chen, K.-H. Hellwich, M. Hess, K. Horie, R. G. Jones, J. Kahovec, T. Kitayama, P. Kratochvíl, S. V. Meille, I. Mita, C. dos Santos, M. Vert and J. Vohlídal, *Pure Appl. Chem.* **2014**, 86(6), 1003-1015.

2007-008-1-400 *Multilingual Encyclopedia* (dos Santos) accessible online

Projects in the final stage of preparation:

2006-051-1-800 (2006-006-1-800) *Source Based Nomenclature for Modified Polymer Molecules*

2003-042-1-800 *Source Based Nomenclature for Single-Strand Organic Polymers*

2005-005-2-400 (2011-033-1-400) *Terminology of Properties of Macromolecules in Solution*

Project Applications under review:

2014-014-1-400 *Terminology for modeling and simulation of polymers (ModSim)* - Meille

2013-050-1-400 *Definition of Terms Relating to the Ultimate Mechanical Properties of Polymers* – Adhikari

Work in progress:

Close to finalization:

2001-081-1-800 *Terminology and Structure-Based Nomenclature of Dendritic and Hyperbranched Polymers* – Fradet & Kahovec

2008-015-1-400 *Preferred Names of Polymers* – Mormann

2008-020-1-400 *Revision of the Division IV Web-based Terminology Guidelines* – Hodge

2009-047-1-400 *Stereochemical Aspects in Polymer Science* – Hellwich & Moad

2010-036-1-400 *List of Keywords* – dos Santos & Slomkowski

2013-048-3-400 *A Brief Guide to Polymer Terminology (Brief Terms)* – Hiorns, Vohlídal

Others:

2006-028-1-400 *Terminology for Conducting, Electroactive and Field-responsive Polymers* – Vohlídal

2010-007-1-400 *Terminology for Chain Polymerization* – Moad

2011-035-1-800 *Terminology & Nomenclature of Inorganic & Coordination Polymers* – Jones (collaborative project of Divisions II, IV & VIII)

2012-001-1-400 *Terminology of Nanomaterials and Nanotechnology in Polymer Science* – Ober & Jones

2012-042-1-400 *Terminology Relevant to Lactic Acid-based Polymers:*

Synthesis, Structure, Properties, Applications & Degradation – Vert

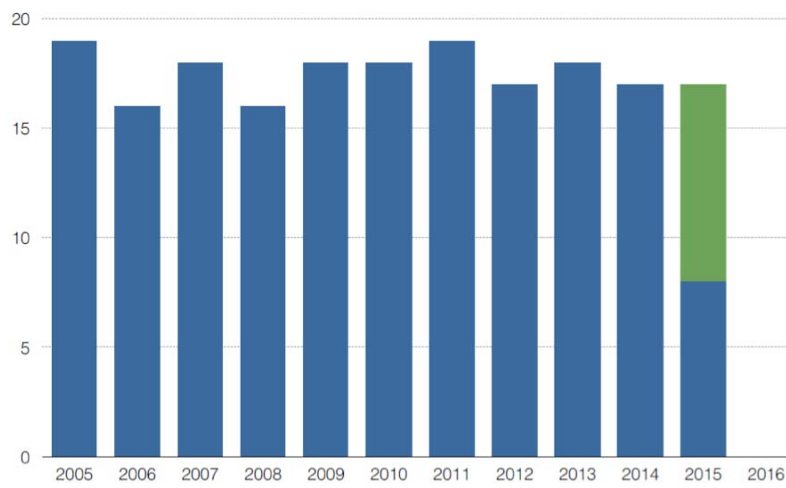
2013-027-3-400 *Enhancing Educational Website for Polymer Chemistry* – Ober

2013-031-2 - 800 *Structure-based Nomenclature for Regular Star and Brush Polymers*

Two new projects are submitted and 9 will be finished within the year 2015.

By the end of 2015 we will have only about 8 running projects.

Project history:



The Project history above (presently 15 running projects) shows that new projects are required in 2015.

Projects, drafts of which are in preparation:

Terminology for Rubber Elasticity – Adhikari
Siloxanes – Slomkowski
Brief Guide to Polymer Characterization – Hess
Extended Modified – Vert
Degradation – Vairon
Html-version of PB2 – Moad
Evaluation of Polymer Crystals – Meille
Polymers for 3D-printing – Walter
Extension Terminology for Separation of Polymers - Hess

Projects with other Divisions, the draft of which are in preparation:

Polymer in Tissue Engineering and Regenerative Medicine: A Concise Guide to Terminology – Purbrick
Ionic Liquids/Polymer-Inorganic Devices – Ober
Polymer for Bioelectronics – Walter
Polymer Semiconductors - Walter
Brief Guide to Polymerization – Luscombe
Brief Guide to Microstructure – Stingelin
Media Terms – dos Santos

Project to Program Committee:

Educating Updating Wikipedia: Synchronizing Polymer Definitions and Terminology - Hess

7. Report Subcommittee Structure and Properties of Commercial Polymers - SPCP (Jiasong He)

The Subcommittee is formed by 63 members from 13 countries (27 members from industry). The East Asian Research Meeting (#71A) was hosted by Shuichi Maeda, Ube Industries, 12.11.2013, Ube Japan. There were 16 participants from 3 countries (academia 12, industry 4). The Subcommittee Meeting #72 was hosted by Volker Altstaedt, University Bayreuth (28.04.-30.04.2014) Bayreuth, Germany. The meeting was attended by 20 participants from 7 countries (academia 11, industry 9).

There was one publication since the Istanbul Meeting:

[90] M. Yamaguchi*, T. Yokohama, B. M. A. Mohd Amran,
Effect of flexible fibers on rheological properties of poly(lactic acid) composites under elongational flow
Nihon Reoraji Gakkaishi (J. Soc. Rheol., Jpn.), 2013, 41 (3), 129

Currently, there are the following **active projects**:

- (IUPAC No. 2005-023-2-400)
Microstructural, melt processing and mechanical properties of compatibilized PA6/ABS Blends
Task Group Leader: Dr. Helge Steininger, BASF Aktiengesellschaft, Germany
- (IUPAC No. 2007-004-1-400)
Guidelines for shear rheometer calibration and performance check
Task Group Leader: Dr. Ullrich Handge, Helmholtz-Zentrum Geesthacht, Germany
Paper has been **submitted** for publication in **PAC**.
- (IUPAC No. 2008-028-1-400)
Elongational rheometry devices for shear rheometers
Task Group Leader: Dr Dietmar Auhl, Maastricht University, The Netherlands
- (IUPAC No. 2010-019-1-400)
Characterization, rheology and mechanical properties of high and ultra-high molecular weight polyethylene
Task Group Leader: Prof. Clive Bucknall, Cranfield University, United Kingdom
Project is running for 4 years now, so it will be coming to its end.
Many results have become available and presented during the April meeting.
Three papers are planned to finalize the project:
 - 1st one on molecular weight determination;
 - 2nd one on the characterization of defects, i.e. crystallinity and crystallization;
 - 3rd one on fracture and wear behavior.However, the molecular characterization of the samples is a point of concern, since different methods seem to give inconsistent results. Therefore it is decided to define (a) new project(s) on the molecular weight characterization (coordinated by Klaas Remerie) and on the bonding strength and measurement

techniques (coordinated by Junjie Wu with support of Clive Bucknall).

A publication is in preparation (PAC):

Characterization, rheology and mechanical properties of high and ultra-high molecular weight polyethylene

- (IUPAC No. 2010-029-3-400)

Relation between rheological properties and foam processability for polypropylene

Task group leader: Prof. M. Yamaguchi, Japan Advanced Institute of Science and Technology, Japan

Running feasibility studies:

Feasibility Study No. 15

Rheology of foaming

Participants: Wassner, Mangus, Auhl, Dijkstra, Handge

No change in the situation with the availability of the MultiPass Rheometers, so it remains dormant.

Feasibility Study No. 9

Comparison between experiment and simulation of extrudate swell

Participants: Mangnus, Auhl, Vittorias, Handge, Kroll, Zoetelief, Remerie, Slouf

The objective is to develop a representative methodology to measure extrudate swell for polymer melts.

There is still interest in this topic, so that the future of this study will be discussed by the proposer and his colleagues.

New Proposals for Feasibility studies

- Steiniger: **Continuous fibre composites containing Carbon NanoTubes (CNT)**
- Nowak: **Morphology-induced structure formation determined by LAOS (FT-rheology)**
- Auhl: **Comparison of modulated DSC, Flash DSC and TOPEM**
- Dijkstra, Bailey, Laun: **Update of the SC history**
- Wu: **Performance of PEEK in orthopaedic devices**
- Dijkstra: **TPU rheology**
- Zoetelief: **RheoDSC**
- Vittorias/Remerie: **Crack propagation in PE-pipes**
- Takigawa: **Rheology of polysaccharides**
- He: **Polyketones**

The next meetings will be: 2014 Subcommittee EA Meeting No. 72A, November 19-20, Luoyang, China, hosted by Prof. He, and the 2015 Subcommittee meeting No. 73, April 2015, Prague, Czech Republic, hosted by Dr. Slouf.

8. Trends in Polymer Science - STP (Yusuf Yagci)

Yusuf Yagci gave a review of the trends in Polymer Science from the year 2010 to 23.06.2014 obtained from ISI-WOS data. The detailed graphics can be found in the Appendices 5...8. There is still a significant increase of the number of annual publications in Polymer Science. 42,080 original papers were counted up to the deadline. Most of the articles (24 countries) were published by China (10,515) followed by the USA (7,088), Japan (3,895), and Germany (3,503). The ranking of the journal is led by Applied Polymer Science, followed by Macromolecules, Polymer, J. Polymer Science A – Polymer Chemistry, and 21 others. The most popular scientific field was that of Nanotechnology (15,500), followed by Composites (~8,500), Polymer Synthesis (~8,200), and Characterization (~6,000).

9. Australian ACS-Chapter (Steven Clarke, guest)

Stephen Clarke, inaugural Co-Chair of the Australian ACS Chapter – Polymer Division, reported about the application to establish an Australian ACS – Chapter. The decision about the application is expected in fall 2014. The Australian ACS – Chapter initiative is supposed to have enormous ramification for science in Australia as it links chemistry in Australia with the world largest Chemical Society. Stephen Clarke wants to inform about this initiative and discuss how to interact with the IUPAC Polymer Division going forward and to help strengthen ACS and the activities of the Royal Australian Chemical Institute (RACI) with the IUPAC Polymer Division. He also informed about the plan to have an International Sol-Gel Conference (run by the International Sol-Gel Society) in Adelaide in the summer of 2017.

There is also the plan to host the 18th ISOS (International Symposium on Silicon Chemistry) in the summer of 2017. The application is in competition with a Chinese bid. The South Australian Government has already promised to support both events with USD 75,000 in total. A total of 750 – 1,000 delegates are expected in sum for both conferences.

The Polymer Division was pleased to hear about the about the Australian activities and is open to cooperation on equal terms. The advantage for IUPAC would be cooperation with an ACS-Chapter run by Australians in a rather complementary than competitive way. Further contact will be kept.

10. Report of the Subcommittee on Modelling of Polymerization Kinetics and Processes – SKM (R. A. Hutchinson)

The Subcommittee consists of 44 members from 16 countries. Asia and the UK are underrepresented. The majority of members comes from academia (36), followed by industry (5), and research institutes (3).

The Subcommittee focuses on the important area of critically evaluating kinetic parameters of polymerization reactions. This is a broad field covering parameters like *propagation rate coefficients*, *termination rate coefficients*, *initiation rate parameters*, and *reversible-deactivation radical polymerization kinetics*, and all this for a number of monomers of industrial importance (styrene, acrylates, methacrylates) in different solvents. This implies *establishing reliable methodologies* of determination in a network of cooperating scientific partners all over the world.

The success of the work of the Subcommittee is best reflected by the number of citations of the publications from June 22nd 2012 to June 22nd 2014, for a detailed list see Appendix 9:

There is a total number of 2342 citations with an increase of 257 during the last biennium.

A very successful series is that of the propagation rate coefficients:

Monomer	Journal	Year	Web of Science Citations (Jun14)
1. Styrene	<i>Macromol. Chem. Phys.</i>	1995	526
2. Methyl Methacrylate	<i>Macromol. Chem. Phys.</i>	1997	400
3. Alkyl Methacrylates	<i>Macromol. Chem. Phys.</i>	2000	162
4. Functional Methacrylates	<i>Macromol. Chem. Phys.</i>	2003	61
5. <i>n</i> -Butyl Acrylate	<i>Macromol. Chem. Phys.</i>	2004	190
6. Methacrylic Acid	<i>Pure Appl. Chem.</i>	2007	30
7. Methyl Acrylate	<i>Polym. Chem.</i>	2014	2
8. Vinyl Acetate (new)			

Finished Projects:

- Methyl acrylate propagation – 2014 publication
- Aqueous-phase propagation – 2014 submission
- RAFT polymerization mechanism

Continuing Projects:

- NMP rate parameters
- Initiation rate parameters

New Projects (initiated late 2013)

- Styrene polymerization rate parameters
- Vinyl ester propagation
- Chain-length dependent termination

In detail:

Project 2004 – 034 – 1 – 400

Critically evaluated propagation rate coefficients for free-radical polymerization of water-soluble monomers polymerized in the aqueous phase. **Lacik**

Start October 2004, **completion 2013**, 1 publication, 1 submitted.

Project 2011 – 034 – 2 – 400

Critically evaluated rate coefficients for (methyl) acrylate propagation. **Barner-Kowollik & Junkers**

Start April 2012, **completion 2014**, 1 publication.

Project 2004 – 040 – 1 – 400

Towards a holistic mechanistic model for reversible addition-fragmentation chain transfer (RAFT) polymerizations: Dithiobenzoates as mediating agents. **Vana**

Start February 2005, **completion 2013**, 1 publication.

Project 2009 – 050 – 1 – 400 (ongoing)

Critically evaluated rate coefficients associated with initiation of radical polymerization. **Moad**

Start April 2010

Current status: Preparation of a manuscript with a compilation of published data and a recommendation for AIBN and a review on azo initiation to be published in *Progr. Polym. Sci.* Both to be published in 2014.

Project 2010 – 027 – 2 – 400 (ongoing)

Critically evaluation of dissociation rate coefficients for alkoxyamines. Guillaneuf

Start February 2011

Current Status: Collecting data for 2,2,6,6-tetramethyl-1-piperidinyloxy radical (TEMPO) and N-tert-butyl-N-(1-diethylphosphono-2,2-dimethylpropyl) nitroxide (SG1). Data are currently processed; manuscript preparation started.

Project 2013 – 045 – 1 – 400 (new)

Critically evaluated rate coefficients for vinyl ester propagation. Hutchinson

Start November 2013

Current Status: Data being collected; data compilation to follow (older 1990's + new data obtained with higher repetition rate lasers).

Project 2013 – 047 – 1 – 400 (new)

Critically evaluated rate coefficients for radical polymerization of styrene. Beuermann

Start November 2013

Planned: Collection and critical review of published data for all relevant elementary reactions.

Project 2013 – 051 – 1 – 400 (new)

Critically evaluated rate coefficients for chain-length-dependent termination in radical polymerization. Russell

Start November 2013

Planned: Data collection to start after imminent publication by Buback of styrene CLDT data measured by SP-PLP-ESR.

Future project ideas:

- *Critically evaluated **termination rate coefficients** as a function of **conversion***
- *Critically evaluated **chain-transfer** rate coefficients and constants*
- *Critically evaluated **depropagation** rate coefficients*
- *Critically evaluated **copolymerization reactivity ratios***
- *Critically evaluated **combination/disproportionation** ratios*
- *Critically evaluated rate coefficients for **ionic polymerizations***
- ***ATRP**: current situation on mechanisms; benchmark rate coefficients*
- *Set of benchmark rate coefficients for a **particular monomer***

11. Report Sub-Committee on Polymer Education - SPed (Werner Mormann)

Project #2013-046-1-400 (Kratochvil)

18th UNESCO/IUPAC Postgraduate Course in Polymer Science 2013/2014 (Prague)

Objective: To enable young university graduates and PhDs from countries with limited research facilities to acquire knowledge on recent advances in polymer science and professional skills needed for promotion of polymer science in their home countries. Details at www.imc.cas.cz/en/umch/kursy_unesco_iupac.htm

The 18th UNESCO/IUPAC Course started October 2013 – ends July 2014, there are 12 students from Croatia, Poland, Russia, Ukraine, and Vietnam. The 19th UNESCO/IUPAC Course is in preparation.

Cumulative results of the 18 runs:

graduates: 150 from 21 countries, **publications** in international journals: 321, communications at **international meetings:** 329, **citations:** 5900 (all as of January 2014).

POLYCHAR 22, World Forum on Adv. Materials -IUPAC Conference and Short Course on Polymer Characterization, 7-11 April 2014, Stellenbosch, South Africa (Hess)

There was no application for financial support from IUPAC by the South African organizers (therefore no project number this year). However, the whole event was accepted – as in the years before – as an IUPAC Conference.

POLYCHAR 22 – World Forum on Advanced Materials – was hosted from 07.04.2014 to 11.04.2014 by the **Department of Chemistry & Polymer Science of the University of Stellenbosch (South Africa)**. This was **the first time in its history in Africa**, after Denton (Texas, 1992-2003), Guimarães (Portugal, 2004), Singapore (2005), Nara (Japan, 2006), Buzios (Brazil, 2007), Lucknow (India, 2008), Rouen (France, 2009), Siegen (Germany, 2010), Kathmandu (Nepal, 2011), Dubrovnik (Croatia, 2012), Gwangju (South Korea, 2013).

With 87 Oral Contributions (31 invited speakers) in addition to the keynote speakers:

Eric Baer (Case Western Reserve University, Cleveland, USA), New Nanofibre and Nanolayer Systems by forced Assembly

Michael Brook (McMaster University, Hamilton, Canada), Manipulating Polysiloxane Surfaces using Nature's Polymers

Alan Rowan (Radboud University Nijmegen, The Netherlands), Strain Stiffening the Key to Biomimetic Cytoskeletal Materials

Sadhan Jana (University of Akron, Akron, USA), Functional Materials Design at Nanoscale

Benjamin Hsiao (Stony Brook University, Stony Brook, USA), High Flux Nanofibrous Membranes for Water Purification

Andrew Whittaker (University of Queensland, St. Lucia, Australia), ¹⁹F Molecular Imaging Agents Responsive to in vivo Signals

There were **8 Conference Sessions**, namely

Nanomaterials and Smart Materials (15 contributions)

Physical Morphology (15)

Biomaterials and Green Polymers (11)

Materials Properties and Performance (11)

New Developments in Characterization – Prediction Methods and Simulation (11)

Processing, Rheology and Mechanical Properties (11)

New Developments in Polymer Characterization (7)

General (6)

The **Poster Sessions** comprised 51 contributions.

Three IUPAC poster prizes were awarded to the following young scientists (MSc / PhD level):

Qiong Wu, KTH Royal Institute of Technology, Sweden

A new type of flame retardant foam based on a sustainable biohybrid material of wheat gluten and silica

Jonas Daenicke, Friedrich-Alexander University Erlangen-Nuremberg, Germany

Resilience of silicone breast implants – new insights by mapping the mechanical properties of implant

Aliza Janse van Rensburg, Cardiovascular Research Unit, South Africa

Heparin and heparan sulfate hydrogels for cardiovascular tissue regeneration.

Bruce Hartmann Prize for a Young Scientist:

Marilio M. Horn, Universidade de Sao Paulo, Brazil

Development and rheological evaluation of chitosan: Pequi oil gels

Lola Olatunji, Federal Institute of Industrial Research, Lagos-Nigeria

Development and production of mechanical penetration enhancers (MPEs) from natural polymers extracted from fish scales

Jürgen Springer Prize for a Young Scientist:

Alexandre Dhotel, University de Rouen, France

Molecular motions within self-assembled monolayers

Rueben Pfukwa, University of Stellenbosch, South Africa

Finite nanostructures by controlled hierarchical self-assembly of foldamers

Carl Klason Prize for the best Student Presentation:

Xianhu Liu, University Erlangen-Nürnberg, Germany

Mapping the electrical conductivity of carbon black filled composites prior to and after shear

Jorge Arturo Soto Puente, Normandie University, France

Molecular mobility and transport properties of multi-layered EVA/EVOH films

Diplomas of Distinction (4) for a **Student Presentation:**

Elrika Harmzen, University of Stellenbosch, South Africa

Rita C.P. Nunes, Federal University of Rio de Janeiro, Brazil

T.P. Gumede, University of the Free State (Qwaqwa Campus), South Africa

Xavier Monnier, University de Rouen, France

In total there were 171 delegates from 31 countries and 5 continents. 46 participants were students.

Delegates from countries other than South Africa came from Australia, Austria, Belgium, Brazil, Canada, China, Colombia, Croatia, Czech Republic, Egypt, France, Germany, India, Italy, Japan, Malaysia, Nepal, New Zealand, Nigeria, Poland, Portugal, Saudi Arabia, South Korea, Sweden, Thailand, The Netherlands, Turkey, United Kingdom and USA.

The **Short Course on Polymer Characterization** contained 7 lectures of 60 min each and had 43 participants:

- **Glass Transition and Disorder in Polymer Materials** – How to Characterize What Happens at the Glass Transition, Jean-Marc Saiter, University of Rouen, Rouen, France

- **Comprehensive Analysis of Macromolecules by Chromatographic Methods**, Peter Kilz, PSS Polymer Standards Service, Darmstadt, Germany
- **Dynamic-Mechanical and Calorimetric Properties of Polymers**, Michael Hess, University of Antioquia, Medellin, Colombia
- **Electron Microscopy of Polymers**, Sven Henning, Fraunhofer Institute for Mechanics of Materials, Halle, Germany
- **Characterization of Polymer Structure, Transitions and Reactions by Pressure-Volume-Temperature Measurements**, Jürgen Pionteck, Leibniz-Institute for Polymer Research Dresden, Dresden, Germany
- **Advanced Fractionation Techniques for the Analysis of Complex Polyolefins**, Harald Pasch, University of Stellenbosch, South Africa
- **Polymer Tribology: Wear is Important from the Economical Point of View, not only Scientific**, Witold Brostow, University of North Texas, Denton, USA

The Short Course was again held the day before the conference lectures started to give the participants – in particular the students – the opportunity to update their knowledge. The registered participants received printed handouts for personal use.

POLYCHAR 23 is planned at the University of Nebraska, Lincoln, Nebraska, May 2015. IUPAC approval has been applied for.

Polymer Education Symposium MACRO 2014

Project #2013-053-1-400 (Mormann, Ober)

Polymer education symposium MACRO 2014 Chiang Mai, Thailand
1.5 days session with 14 oral contributions and a round-table session

Division IV - Polymer Education Website (Ober)

Project #2012-027-3-400

<http://www.iupac.org/polyedu/index.html>

Goal: Enhancing Educational Website for Polymer Chemistry

Task group:

C. Ober (Chair)

R.G. Jones

C. dos Santos

L. Corley (young observer)

Choon Do

Chris Fellows (new member from Australia)

IUPAC Transnational/Transcontinental Call for Proposals in Polymer Chemistry

Project #2012-027-3-400

<http://www.iupac.org/polyedu/DivIVCall/page6/page7/page7.html>

Final presentations in a special workshop at IUPAC Macro 2014 chaired by Martin Moeller and Elodie Burgeat-Lami, Monday, 7-July

The project was very successful but will not be continued in the present form.

The idea of fostering **IUPAC Terminology in Polymer Science Textbooks** as originally planned appears not to be a practical idea and will not be pursued any longer. However, the approach of the SPT offering *Brief Introductions* seems to be promising and is being welcomed by publishers.

Finally, the Chairman of the SPED announced that he is stepping down from the chairmanship by December 31st 2014 and he thanked all members for the interesting time and the fruitful cooperation over the years. Chris Ober will take over as interim chair.

12. Conferences (Igor Lacik)

In December 2013 Prof. P. Kubisa completed his term in reviewing the “Applications for IUPAC Sponsorships” (AIS). Since January 2014, the AIS of Division IV have been reviewed (in communication with P. LeClair¹, who contacts the organizers and asks for amendments in case they are needed) by Igor Lacik. Instead of IUPAC-

¹ Paul LeClair is now no longer with IUPAC

Sponsored conferences, the new term *IUPAC-Endorsed* conferences has started to be used, the reason being that the former was confused with financial Conference support by IUPAC, which is not the custom.

The following guidelines should be followed for application of IUPAC Endorsement of a Conference:

- Organizers of a conference, who wish to apply to IUPAC for sponsorship, should supply the information requested in this questionnaire, preferably one year in advance.
- The conference must be located in a country represented in IUPAC by a National Adhering Organization.
- In general, IUPAC sponsored conferences should be international in the sense that they are intended to attract participants from anywhere in the world. Conferences that are mainly regional in nature may be eligible if IUPAC sponsorship would help to attract a more international audience.

Criteria for granting the IUPAC label are:

- scientific quality
- significance of conference
- suitability of conference
- evidence of sufficient planning
- suitable time spacing of conferences of a similar type
- rotation of leadership for conferences in a series or of a similar type
- International Advisory Board that is geographically diverse
- participation of industrial chemists and women as speakers and as members of the International Advisory Board

Conferences that are routinely endorsed by the Polymer Division:

- International Symposium on Ionic Polymerization
- International Symposium on Macromolecular-Metal Complexes (MMC)
- International Conference on Polymer Characterization (POLYCHAR), World Forum for Advanced Materials
- International Conference on Polymers and Organic Chemistry
- UNESCO School & IUPAC Conference on Macromolecules (routinely in South Africa)
- Novel Materials and Their Synthesis (NMS) (routinely in China)
- IUPAC World Polymer Congress (International Symposium on Macromolecules-MACRO)

In 2014, the Polymer Division endorsed the following Conferences:

- 22nd World Forum on Advanced Materials (POLYCHAR 22)
April 7 – 11, Stellenbosch, South Africa
- 8th International Symposium on Molecular Mobility and Order in Polymer Systems
June 2 – 6, St. Peterburg, Russia
- 15th International Conference on Polymers and Organic Chemistry (POC-2014)
June 10 – 13, Timisoara, Romania
- IUPAC World Polymer Congress 2014 and the 45th International Symposium on Macromolecules (MACRO2014)
July 6 – 11, Chiang Mai, Thailand
- 10th International Conference on Polymer-Solvent Complexes and Intercalates (PolySolvat-10)
September 22 – 25, Salerno, Italy
- 7th International Symposium on Macro- and Supra-molecular Architectures and Materials (MAM-2014)
November 23 – 27, Johannesburg, South Africa
- 78th Prague Meeting on Macromolecules
July 20 – 24, Prague, Czech Republic

The list may be incomplete, this as information was selected from the IUPAC website, <http://www.iupac.org/home/conferences.html>, where some conferences are not listed, e.g. the 78th Prague Meeting on Macromolecules.

Conferences approved (already at the IUPAC webpage) or pending endorsement by Division IV for 2015:

- *POLYCHAR 23*, World Forum for Advanced Material (approved)
May 11 – 15, University of Nebraska, Lincoln, USA (Chairman: Prof. Mehrdad Neghaban)
- *Ionic Polymerizations 2015* (approved)
June 5 – 10, Bordeaux University, Talence, France (Chairman: Prof. Stéphane Carlotti)
- *European Polymer Congress 2015* (approved)
June 21 – 26, Dresden, Germany (Chairman: Prof. Brigitte Voit)
- *35th Australasian Polymer Symposium* (pending)
July 12 – 15, Gold Coast, Queensland, Australia (Chairman: Prof. Amanda Ellis)
- *4th Federation of Asian Polymer Societies - International Polymer Congress* (4th FAPS-IPC 2105) (pending)
October 5 – 8, Kuala Lumpur, Malaysia (Chairman: Professor Dr. Rusli Daik)
- *10th International Conference on Novel Materials and their Synthesis* (NMS-X) (pending)
October 10 – 15, Zhengzhou, China (Chairman: Prof. Shaokui Cao)
- *11th International Conference on Advanced Polymers via Macromolecular Engineering* (APME 2015) (approved)
October 18 – 22, Yokohama, Japan (Chairman: Prof. Takeshi Endo)

Special Macromol. Symp. Issues:

2013

- *Ionic Polymerization*, January 2013, Volume 323, Issue 1, pp. 1–91
- *Polychar 20 – World Forum on Advanced Materials*, June 2013, Volume 328, Issue 1, pp. 1–86
- *Nanostructured and Biorelated Materials*, May 2013, Volume 327, Issue 1, pp. 1–153

2014

- *Macromolecules and Materials*, March 2014, Volume 337, Issue 1, pp. 8–133
- *Polymer Spectroscopy*, May 2014, Volume 339, Issue 1, pp. 1–146

13. Monitoring Projects (Michael Buback)

Michael Buback stressed the fact that new projects are required but that budgets are limited and have decreased. Projects have to be finished according to the plan and the scope has to be realistic. Funding by the Program Committee is only possible if two Divisions apply for support. The Polymer Division's budget has been increased from other sources, such as royalties from Wiley (*Macromol. Symp.*), the Samsung Award and cooperation with other Divisions. All the budget goes to projects. Strict supervision of the projects by subcommittee chairs is required. Interdivisional projects need application well in advance. The present budget situation is shown in Appendix 5. The fate of 6 overdue projects is unclear. While the projects of Wassmer and Yamaguchi turned out to be finished, there is no information about those led by Fitzgerald, Luruli, Steininger and Gilbert. The state of these remaining four projects has to be checked.

14. Vice-President's Topics (Russell)

Greg Russell welcomed all participants and addressed the oncoming elections, in particular of the next Vice President (VP) and Division Secretary. According to the tradition of geographical sequencing, the next VP should be from the Americas, although this is not a strict rule. The former VPs (subsequently Presidents) since 1991 came from USA (Jim Economy), Australia (Bob Gilbert), Europe (Bob Stepto), Asia (Jung-II Jin), USA (Chris Ober), Europe (Michael Buback), and Australasia (Greg Russell). The election/reappointment of 6 TMs (January 2016 – December 2017) is organized by the Secretariat (Michael Buback – Past President by then, will automatically become the 7th TM) after which the AMs are selected internally by the Division.

The present situation is as follows:

TM (elected)	AM (selected)
Jiasong He – China (SPCP)	Dick Dijkstra – Germany (SPCP)
Sabine Beuermann – Germany (SKM)	Robin Hutchinson - Canada (SKM)
Bernadette Charleux – France (SPEd & industry relations)	Tim Long – USA (SPEd)
Roger Hiorns – France (SPT)	Igor Lacik – Slovakia (conferences)
Graeme Moad – Australia (SPT)	Yusuf Yagci - Turkey (STP)
Mitsuo Sawamoto – Japan (strategy)	Dennis Smith –USA (industry relations)
Werner Mormann – Germany (SPEd)	

For possible candidates, the following points have to be considered:

- IUPAC's eligibility criteria
- Spread of expertise across subcommittees
- Retention of expertise
- New blood
- Gender balance
- Future officers
- Geographic spread

There is a maximum of 10 National Representatives (NRs), who may only come from countries that are not already represented in the Division. The NRs are proposed by the National Adhering organizations. Among other points the visibility of the candidates in the Division, their previous work and eligibility for other positions should be considered.

For the period 2014-2015 the official NRs are:

- Voravee Hoven (Thailand)
- Chin-Han Chan (Malaysia)
- Theo Dingemans (The Netherlands)
- Cláudio dos Santos (Brazil)
- Chain-Shu Hsu (China/Taipei)
- Richard Jones (UK)
- Doo Sung Lee (South Korea)
- Aziz Muzafarov (Russia)
- Mohammad Siddiq (Pakistan)
- Jiri Vohlídal (Czech Republic)

For reasons that are not clear, Mario Malinconico's nomination as an NR (from Italy) unfortunately did not come through when the above selections were being made.

The expected sequence for the nominations/elections/selections reads:

- Aug. 2014: deadline for NAOs to submit nominations. It helps for NAOs to make nominations!
- Jan. 2015: Nominating Committee (previously DVP, Ezio Rizzardo, Kris Matyjaszewski, Pavel Kratochvil, Michael Dröscher) advises of candidates
- TM elections
- selection of AMs and NRs
- August 2015: meeting of IUPAC Bureau at the GA (originally planned for April) at which all names are put forward for approval.

The exact dates are not yet known (Chris Ober).² Jung-II Jin asked if the nomination committee is still the same as in previous years (see above). He is missing a member from Asia in the committee. This point should be considered for the future.

There are three Scientific Awards granted under the auspices of the Polymer Division during the IUPAC World Polymer Congress, namely the SAMSUNG Young Polymer Scientist Award, the DSM Materials Science Award and the Polymer International IUPAC Award. Greg Russell suggested that one Award Coordinator should be appointed who has to care for proper nomination/selection procedures. There were no nominations on the spot; however, it would be good to settle this issue by or at the GA 2015 in order to be ready for the IUPAC World Polymer Congress 2016, Istanbul, Turkey.

Jean-Pierre Vairon had raised the question of how to organize the Division/Subcommittee-meetings (practically only the SPT is concerned) in the years when there is a MACRO Congress. The present practice with one week meeting before a MACRO appears to be too long and less attractive for possible new members. In general it was stated that the Subcommittee-meetings should be earlier than the Division meeting. It was suggested to have the SPT meeting during a MACRO Congress and the Division Meeting after the conference. No decision was made.

Finally, the VP stressed the fact that any Task Group Chair is essential for the success and timely finalization of a project and that observation of the progress of projects is essential for the Division's success and future.

Saturday, 05.07.2014

15. Report on Division Web Page and Electronic Publications (dos Santos)

Claudio dos Santos reported that the Division website has been updated and many changes occurred. The new website should be more user-friendly. The old IUPAC website, however, is still accessible – www.old.iupac.org. He asked the Division to check the entries. There is another communicative website for members of the SPT only, called REDMINE and organized by Roger Hiorns. Any input to extend or improve the website is welcome.

16. Strategy (Sawamoto)

There are three strategies to consider: within IUPAC, beyond IUPAC and cooperations. What to do and how? The visibility of IUPAC has to be developed and improved, for example, its presence on conferences such as PACIFICHEM 2015 in Hawaii. The retired Division Presidents are asked to develop ideas and to personally address people. The Wikipedia Project is also well suited to improve the visibility of IUPAC in the scientific community. For the 2019 Centennial in Paris, a task force has been formed to evaluate performance and to check by-laws and everything related to optimization of performance. The same is expected from the individual Divisions. The Division President, Vice President and Mitsuo Sawamoto should complement from the Division side the efforts of the headquarter's activities in revising the mission statement and all of importance for the year 2019. Greg Russell asked for details, e.g. how to improve efficiency, make outside activities visible, improve the structure and start early with corresponding preparations. Jean-Pierre Vairon observed that the Division President will be part of the organizing committee, hence directly participating in the discussion of preparations. Early preparation is vital for a high-impact presentation on the World Chemistry Congress 2019 in order to visualize education, mechanisms and general aspects of polymer science during this important event. The Division's projects should be visible.

17. The President's Statement (Michael Buback)

The budget has shrunk to about USD 25,000 per year and funding has become more difficult. The projects have to be supervised more thoroughly, and it appears to be better to have many small projects rather than a few large and/or long ones that are difficult to supervise. Projects connected with global problems such as water, waste,

² They will all be later than this by several months, due to IUPAC having a new schedule for this process.

pollution, energy etc. are in particular welcome. 2015 will be 'The year of the light'. This might give rise to specific projects, as with 'The year of crystallography'. There is a constant effort to increase the number of National Adhering Organizations. A goal is to have 100 NAOs in the centenary year of 2019. There are a number of countries on the threshold. The ACS has an Australian Chapter – see the report of Stephen Clarke, item 9 of the agenda. In some sense, the World Chemistry Congress in odd years and in combination with the GA might become a competitor of the World Polymer Congress in the even years. The Polymer Division has to take care that no destructive competition is emerging in the future, i.e., highly desired Macro speakers instead speaking only at a WCC.

Personal initiative is asked to improve the IUPAC label in daily life whenever possible. In the view of the chemical public, the reputation of IUPAC is largely restricted to the naming new elements. This has to be changed but can only be accomplished through personal activity. The Division needs closer links to the NAOs, in particular the NRs are asked to show more initiative in this regard. Some of them have never been recognized. Our endorsed conferences also need support through advertising in our countries, universities etc. Fabienne Meyers, the editor of Chemistry International – now published by deGruyter – needs our support through manuscripts about specific problems, our activities and projects. Everyone is encouraged to provide her with suitable material.

18. Future World Polymer Congresses

MACRO 2016 Istanbul (Yagci)

This Conference is planned for Monday 17 – Friday 21 July 2016 in the Halic Congress Centre on the Golden Horn in Istanbul. The general scope will be 'Advancing Polymer Science and Technology'. The composition of the international advisory board and the names of the invited speakers is presently still under discussion. The scientific program is planned to comprise 12 sessions. Support from the Polymer Division and help with the scientific topics is very much appreciated. Topics on physics, simulations, engineering, modelling, mechanisms etc. are planned. A professional company will organize the event. The scientific committee should be visible as well as local and international people in charge. Close contact with the Division President and Vice President is requested.

MACRO 2018 Cairns (Sebastien Perrier, Martina Stenzel)

The Conference venue will be the Cairns Convention Centre that offers all required facilities and accommodation of all kinds in close proximity. See funding of AUD 100,000 has been granted by Tourism and Events Queensland.

Suggested topics/sessions are:

- Latest developments in polymer synthesis
- Latest trends in polymer characterization and modelling
- Advanced materials
- Polymer processing and composites
- Polymer surfaces and interfaces
- Polymers for health
- Polymers and the environment and water treatment
- Polymers for electronics and energy
- Polymer education
- Innovation and industry

For cooperation, sharing experiences and granting continuity, both Yusuf Yagci and Sebastien Perrier/Martina Stenzel will be members of the scientific committees for both Istanbul and Cairns. The problem of visas was raised and that issue will be kept in mind. Polymers and optoelectronic should be considered as a topic, and the titles of the sessions should be up to date. An official letter of confirmation of

endorsement will be sent by IUPAC to the organizers. Sebastien Perrier and Martina Stenzel are both organizing MACRO 2018

MACRO 2020 and 2022

There is still the question to be solved of where the IUPAC World Polymer Congress 2020 should be held if not in Mexico – the application still stands but is not yet confirmed. Michael Buback expects clarification by the end of 2014. The **Korean Polymer Society** has offered to take over and proposes Jeju Island as a favorable location. Further, this could be the site of Macro 2022 if Mexico ends up hosting in 2020. Korea has already organized the IUPAC World Polymer Congress in Seoul in 1996. The tentative program (Sessions) for **2020 or 2022** could read:

- Advances in polymer synthesis and characterization
- Advances in polymer structure, property and processing
- Advances in functional polymers
- Nanostructured polymeric materials
- Polymers for information technology
- Polymers for biomedical application
- Polymers for clean energy
- Eco-friendly polymers

The General Assembly 2015

48th General Assembly 6 – 13 August 2015, 45th World Chemistry Congress, 9 – 14 August 2015, Busan (Bexco), Korea (Jin)

Jung-II Jin pointed out that there are convenient domestic flights from Incheon International Airport to Gimhae Airport Busan (it is no longer necessary to transfer to Seoul's domestic airport Gimpo!) and there is also a direct very convenient express train. Also, Busan has an international Airport (Gimhae International Airport) that is directly accessible from 27 cities in 10 countries (mostly Asian), and there are 628 international flights per week, e.g. from Tokyo, Nagoya, Osaka, Manila, Hongkong, Bangkok, Shanghai, Munich. He encouraged everybody to look for people interested in participating in the World Chemistry Congress and to forward information. Since there is only a minor overlap of the GA and the Conference there is enough time to participate in the conference, too.

Amongst others the Nobel Laureates Andre Gleim, UK (2010), Akira Suzuki, Japan (2010), Roger D. Kornberg, USA (2006), and Yuan T. Lee, Taiwan (1986) will be plenary speakers. There will be 69 different Symposia covering 11 themes – with a significant contribution from Macromolecular Science & Technology (1440 min). The Polymer Society of Korea is organizing a symposium with sessions on Polymer Synthesis, Macromolecular Biotechnology, Macromolecular Nanotechnology, Macromolecules for Electronics and Photonics, and Macromolecules for Energy on August 10th and 11th. Busan ranks as the 4th convention city in Asia after Singapore, Seoul and Tokyo and as the 17th in the world.

19. Reports from NR's

MACRO 2014, Chiang Mai (Tantanayon)

There were 5 invited speakers, 6 keynote/awardee speakers, 200 invited talks and 776 contributed papers in 17 parallel oral sessions and 2 poster sessions. Two pre-conference workshops were offered by COAX (Surface Analysis by SEM/EDX and AFM) and Bruker (Chemical Structural Analysis by NMR). Student scholarships (travel and accommodation) were granted from IUPAC for students from Brazil (1), India (2), China (3), Chile (1), Japan (3), and Saudi Arabia (1). The PTT-Group covered the conference fee for 50 students, from Nepal (1), Malaysia (3), China –Taipei (3), South Korea (6), Hong Kong (1), Thailand (22), Turkey (1), India (2), China (3), Chile (1), Japan (3) and Brazil (1). Dow covered the conference fee for an additional 20 Thai students.

The total registration was 1074 participants with 473 international and 328 local registrations, 175 international committee speakers and 98 locals.

Report from Malaysia (Chan)

Chin Han Chan reported from the Institute Kimia Malaysia (IKM), the Malaysian Polymer & Materials Chemistry Section, Kuala Lumpur, Malaysia, <http://www.ikm.org.my> email: ikmmy@pc.jaring.my

The main activities of IKM are organizing conferences and workshops, interacting with industry to exchange ideas and opinions, fostering and maintaining strong international links in the polymer and materials science community, fostering and maintaining good relationships with other professional bodies and governmental and other national agencies. IKM is a member of the Federation of Asian Polymer Societies (FAPS) and the Pacific Polymer Federation (PPF), the Malaysian Plastic-Manufacturers Association (MPMA) and the Plastic and Rubber Institute of Malaysia (PRIM). Regional and international conferences are organized, the latter usually in Kuala Lumpur. An upcoming event is the 4FAPS PC 2015 – Functional Polymers and Advanced Materials for the Future, October 5 – 8 2015, Kuala Lumpur. Recent International conferences were Asian Chemical Congress 2007, CHEMRAWN XIX 2011, ASIA LABS 2011, International Symposium on Women in Science and Engineering (WISE) 2011, 17th Malaysian Chemistry Congress 2012, the Cambodian Malaysian Chemical Conference (CMCC) 2012, International Conference on Water and Waste-Water Management (ICWWM) 2013, 18th Malaysian International Chemical Congress (MICC) 2014, Vietnam-Malaysia International Chemical Congress (VMICC) 2014.

Report from Italy (Malinconico)

The reduction of the Italian budget has resulted in a concentration on the support of young scientists in Italy. There is an Italian National Committee for the cooperation with IUPAC. In 2016 they will organize CHEMRAWN (Urban solid waste management) in Rome (06.-08.04.2016),.

For further information see www.iupac2015.org

20. Other Businesses (Buback & participants)

None.

21. Date of Next Meeting (Hess)

48th IUPAC GA (6 – 13 August 2015) and 43rd World Chemistry Congress (9 – 14 August 2015) Busan, South Korea http://www.iupac2015.org/main/general_assembly.htm

Division Meeting: Sat 8 and Sun 9 August

SPT Meeting: Mon 10 – Thu 13 August

22. Closing remarks

Michael Buback closed the 2014 meeting of the Polymer Division and thanked all participants for their fruitful cooperation since the Istanbul meeting, wished everyone safe travel back home, and looked forward to seeing all again at the GA 2015 in Busan.

Michael Hess (Secretary), January 2015

APPENDIX 1

IUPAC POLYMER DIVISION MEETING July 4-5, 2014 Hotel Meridien, Chiang Mai, Thailand Agenda

Friday, July 4, 2014, 09:00-18:00

1. President's Introductory Remarks and Finalizing of the Agenda (Buback)
2. Apologies for Absence
3. Approval of the Minutes of the Division Meeting, Istanbul, Turkey, August 2013 (Hess)
4. Matters Arising (Buback)
5. Report on InterDivSubcomMaterChem - ISMC (Ober)
6. Report on Terminology and Nomenclature Projects - SPT (Hiorns)
7. Report on Structure-Properties Projects - SPCP (He)
8. Report on Trends in Polymer Science - STP (Yagci)
9. Stephen Clarke, co-chair Australian ACS Chapter Polymer Division
10. Report on Polymerization Kinetics & Mechanics - SKM (Hutchinson)
11. Report on Educational Projects and Activities - SPED (Mormann)
12. Report on Division-Endorsed Conferences (Lacik)
13. Monitoring Projects (Buback)
14. Vice-President's Remarks (Russell), including upcoming Division elections and appointments

PHOTO DATE BEFORE LUNCH BREAK

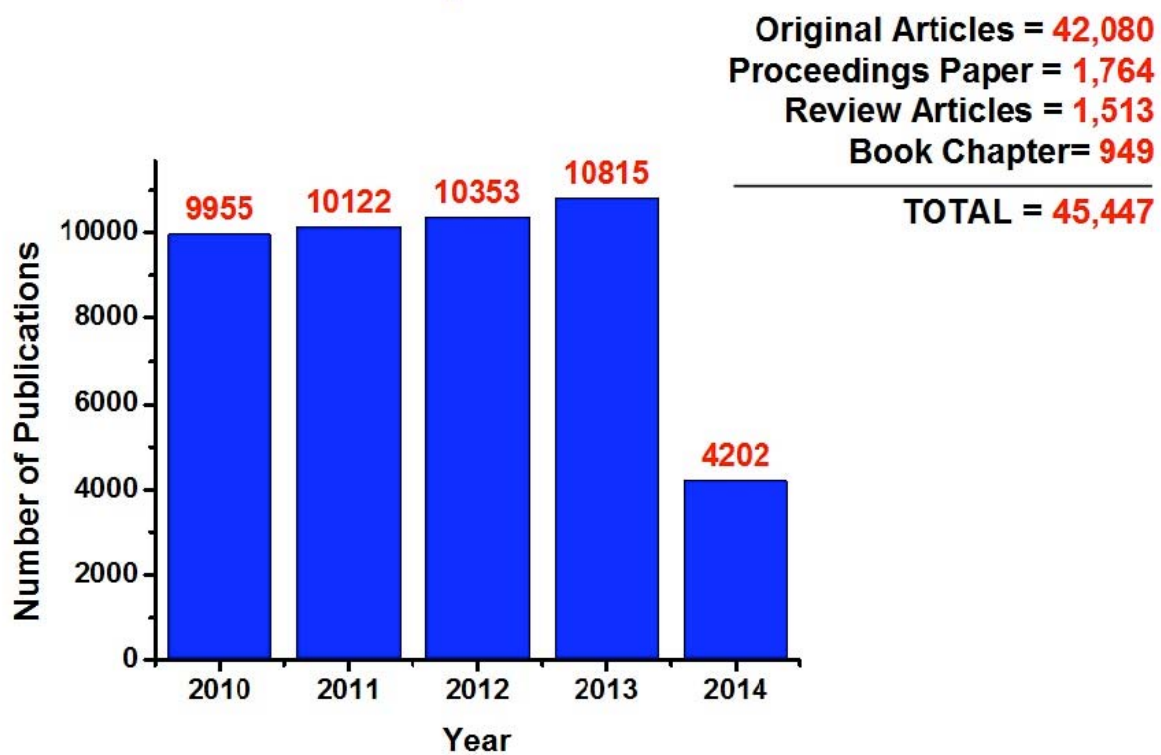
DIVISION DINNER LEAVE 18:30 TONIGHT
Saturday, July 5, 2014, 09:00 - 12:30

15. Electronic Communication (dos Santos)
16. Strategy (Sawamoto)
17. President's Remarks (Buback)
18. Future Conferences (Yagci - **Istanbul 2016**, Perrier - **Cairns 2018**, Lee - **MACRO 2020, Korea (?)**, Buback - **Mexico 2020 (?)**), Lee, **GA Busan 2015**, C. H. Chan, Conference on Functional Polymers - Advanced Materials (**4th FAPS**), **Kuala Lumpur 2015**, C. H. Chan, **Local Organizers MACRO 2014 (Chiang Mai)** S. Tantanayon
19. Report by National Representatives
20. Other Business (participants)
21. Next Meeting (Hess) **48th IUPAC GA (06.08.-13.08.2015) and 43rd World Chemistry Congress (09.08.-14.08.2015) Busan, South Korea**
http://www.iupac2015.org/main/general_assembly.htm

Appendix 3

Through 17 June 2014	Actual	Budget	Budget Over/ (Under)	% of Budget	Planned End Date
400-Macro					
IMACRO Contract	50,146	60,000	(9,854)	84%	
Samsung Fund Income	34,500	73,772	(39,272)	47%	
Wiley VCH Royalties-	8,512	12,980	(4,468)	66%	
2003-009-1-400 Wassner	-	-	-	-	30-Jun-2008
2004-022-3-400 Fitzgerald	7,000	7,000	-	100%	30-Apr-2007
2004-040-1-400 Vana	3,498	3,500	(2)	100%	1-Sep-2012
2005-005-2-400 Chang/Stepsto	6,000	6,000	-	100%	31-Mar-2014
2005-007-1-400T Wilks	-	-	-	-	Terminated
2005-011-3-400 Luruli	2,344	5,000	(2,656)	47%	31-Dec-2012
2005-023-2-400 Steininger	3,000	3,000	-	100%	31-Dec-2013
2006-004-1-400 He	6,000	6,000	-	100%	30-Dec-2014
2006-028-1-400 Vohidal	6,000	6,000	-	100%	1-Sep-2009
2007-004-1-400 Handge	2,425	4,000	(1,575)	61%	31-Dec-2014
2007-008-1-400 dos Santos	11,000	11,000	-	100%	1-Sep-2012
2007-058-1-400 Gilbert	2,664	6,000	(3,336)	44%	31-Dec-2013
2008-015-1-400 Mormann	5,578	6,000	(422)	93%	30-Jun-2011
2008-020-1-400 Hodge	4,638	5,000	(362)	93%	31-Jul-2014
2008-028-1-400 Auhl	-	5,000	(5,000)	-	30-Jun-2014
2009-019-2-400 Meira	3,810	5,000	(1,190)	76%	30-Jun-2015
2009-047-1-400 Hellwich	5,524	6,000	(476)	92%	1-Apr-2013
2009-050-1-400 Moad	3,400	5,300	(1,900)	64%	30-Sep-2014
2010-007-1-400 Moad	4,410	6,000	(1,590)	74%	30-Sep-2014
2010-019-1-400 Bucknall	4,517	5,000	(483)	90%	1-Apr-2014
2010-027-2-400 Bertin	-	1,000	(1,000)	-	31-Dec-2013
2010-029-3-400 Yamaguchi	3,000	3,000	-	100%	31-Dec-2013
2010-032-3-400 Mormann	3,353	9,000	(5,647)	37%	30-Sep-2014
2010-036-1-400 dos Santos	2,000	2,000	-	100%	31-Dec-2012
2011-013-2-400 Hess	5,320	5,360	(40)	99%	31-Dec-2013
2011-033-1-400 Chang/Stepsto	3,000	3,000	-	100%	31-Mar-2014
2011-034-2-400 Barner	1,000	1,000	-	100%	1-Mar-2014
2012-001-1-400 Ober	1,990	6,000	(4,010)	33%	31-Jan-2015
2012-027-3-400 Ober	842	6,000	(5,158)	14%	1-Mar-2015
2012-042-1-400 Vert	2,462	4,500	(2,038)	55%	31-Dec-2014
2012-048-3-400 Hiorns	-	6,800	(6,800)	-	1-Jun-2016
2013-012-1-400 Buback	-	10,000	(10,000)	-	31-Dec-2014
2013-045-1-400 Hutchinson	-	5,000	(5,000)	-	1-Nov-2016
2013-046-1-400 Kratochvil	5,000	5,000	-	100%	31-Dec-2014
2013-047-1-400 Beuermann	-	4,000	(4,000)	-	1-Nov-2016
2013-049-1-400 Hess	-	2,500	(2,500)	-	31-Dec-2014
2013-051-1-400 Russell	-	6,000	(6,000)	-	1-Nov-2017
2013-053-1-400 Mormann	-	1,800	(1,800)	-	31-Dec-2014
2014-007-1-400 Hoven-Tantayanon	-	5,000	(5,000)	-	1-Sep-2014

Publications of Polymer Science from 2010 to 2014



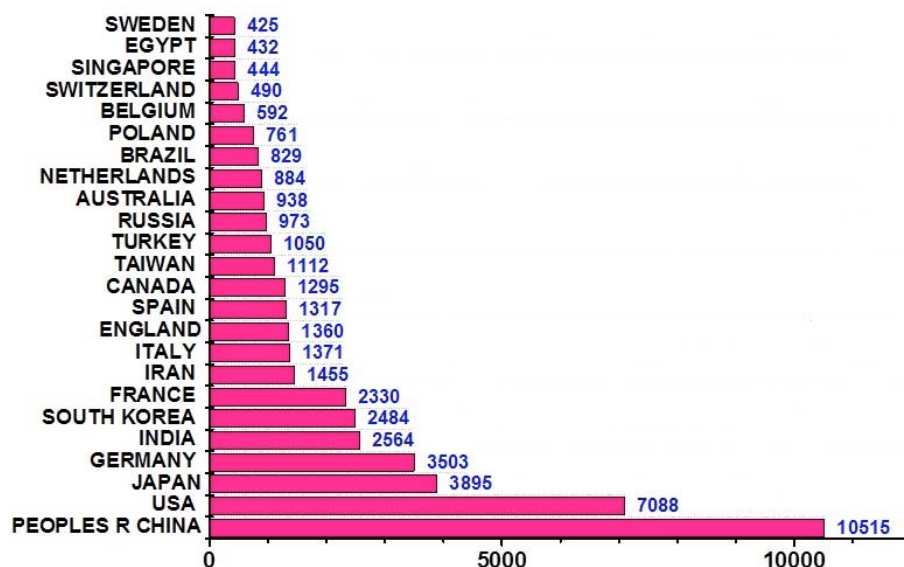
Original Articles = 42,080
Proceedings Paper = 1,764
Review Articles = 1,513
Book Chapter = 949

TOTAL = 45,447

*All data taken from ISI-WOS 23.06.2014

APPENDIX 5

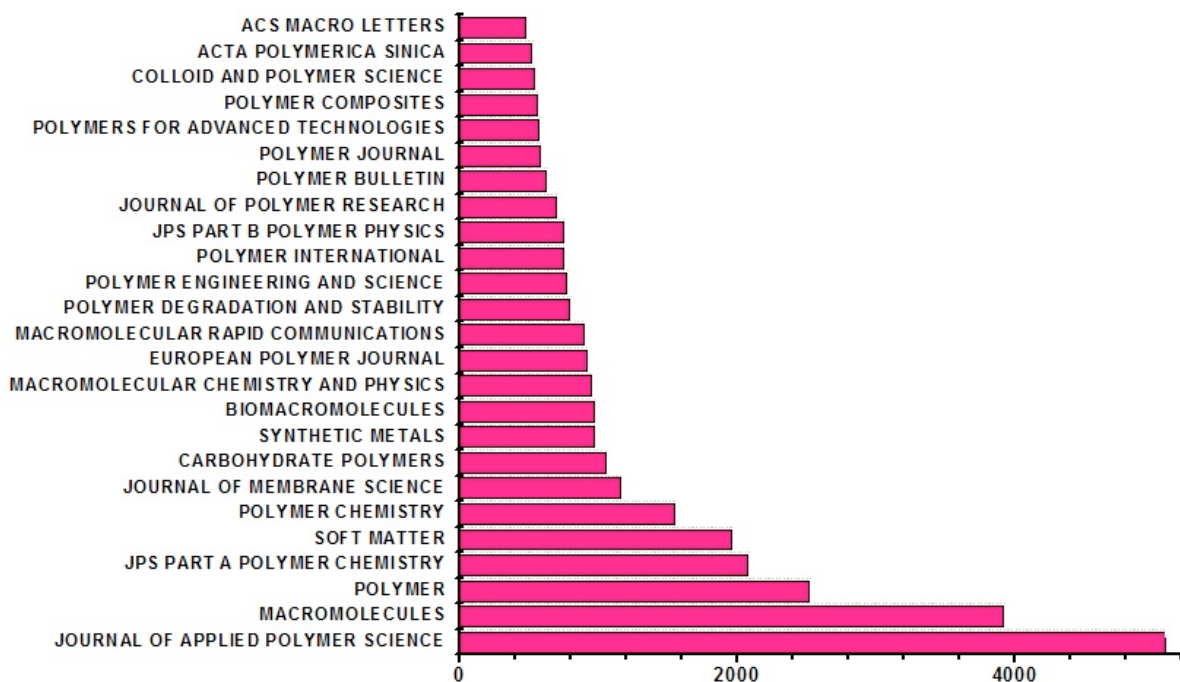
2010-2014 ARTICLES by COUNTRIES



*All data taken from ISI-WOS 23.06.2014

APPENDIX 6

2010-2014 ARTICLES by JOURNALS



*All data taken from ISI-WOS 23.06.2014

APPENDIX 7

2013 JOURNAL IMPACT FACTORS

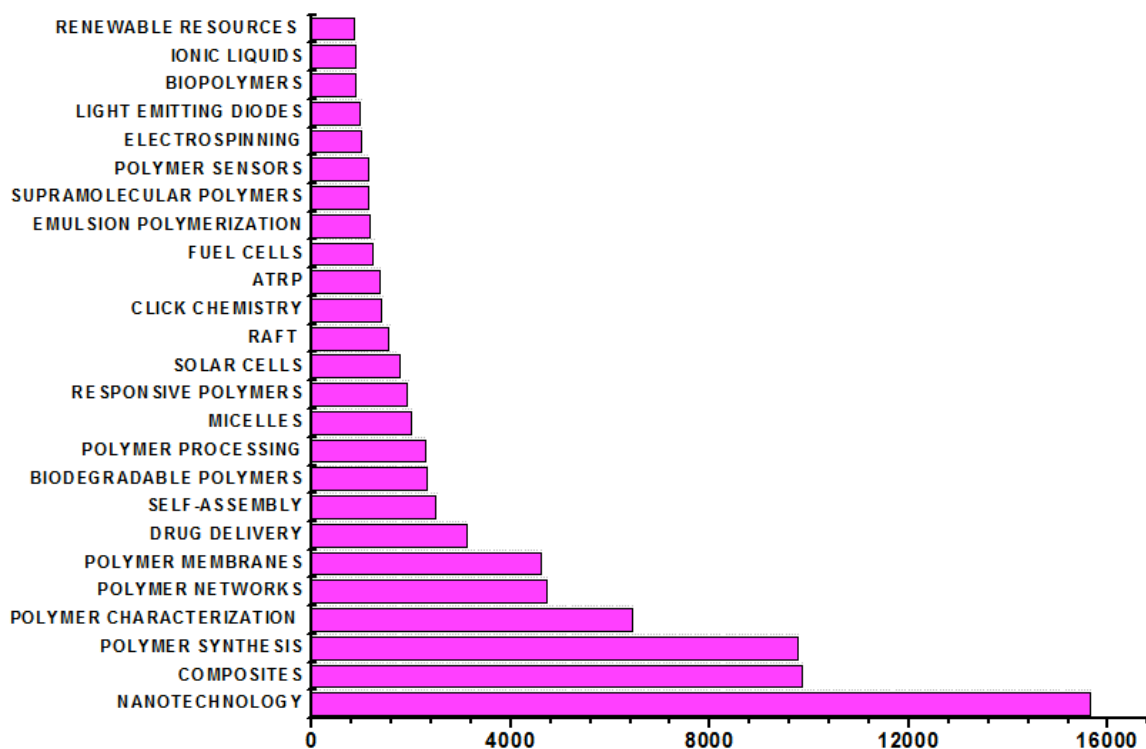
Rank	Journal Title	2012 Impact Factor	Number of Articles from 2011-2012	Their Citations in 2013	2013 Impact Factor
1	PROG POLYM SCI	26.383	103	2856	27.73
2	POLYM CHEM-UK	5.231	744	5146	6.92
3	POLYM REV	7.794	27	182	6.74
4	MACROMOLECULES	5.521	2234	14009	6.27
5	BIOMACROMOLECULES	5.371	999	6002	6.01
6	J MEMBRANE SCI	4.093	1336	6901	5.17
7	MACROMOL RAPID COMM	4.929	511	2537	4.96
8	SOFT MATTER	3.909	2711	12238	4.51
9	J POLYM SCI POL PHYS	2.221	345	1486	4.31
10	CARBOHYD POLYM	3.479	1837	7829	4.26
11	POLYMER	3.379	1429	5736	4.01
12	MACROMOL BIOSCI	3.742	337	1261	3.74
13	J POLYM SCI POL CHEM	3.543	1132	4032	3.56
14	EUR POLYM J	2.562	454	1590	3.50
15	ADV POLYM SCI	3.648	99	326	3.29
16	CELLULOSE	3.476	332	1093	3.29
17	REACT FUNCT POLYM	2.505	275	866	3.15
18	EXPRESS POLYM LETT	2.294	192	595	3.10
19	MACROMOL MATER ENG	2.338	228	685	3.00
20	PLASMA PROCESS POLYM	3.73	224	657	2.93

Rank	Journal Title	2012 Impact Factor	Number of Articles from 2011-2012	Their Citations in 2013	2013 Impact Factor
21	POLYMERS-BASEL	1.687	202	556	2.75
22	POLYM DEGRAD STABIL	2.77	600	1650	2.75
23	MACROMOL CHEM PHYS	2.386	536	1472	2.75
24	COLLOID POLYM SCI	2.161	405	1066	2.63
25	INT J POLYM MATER	1.865	177	448	2.53
26	J BIOACT COMPAT POL	2.207	86	217	2.52
27	DES MONOMERS POLYM	0.875	81	199	2.46
28	POLYM INT	2.125	457	1104	2.42
29	SYNTHETIC MET	2.109	815	1848	2.27
30	POLYM-PLAST TECHNOL	1.481	466	1048	2.25
31	POLYM TEST	1.646	267	567	2.12
32	ADV POLYM TECH	1.096	68	137	2.01
33	POLYM ADVAN TECHNOL	1.635	554	1116	2.01
34	EUR PHYS J E	1.824	262	496	1.89
35	MACROMOL THEOR SIMUL	1.606	116	214	1.84
36	J POLYM RES	2.019	565	1024	1.81
37	MACROMOL RES	1.639	377	672	1.78
38	MACROMOL REACT ENG	1.638	81	140	1.73
39	CHINESE J POLYM SCI	1.27	188	324	1.72
40	J APPL POLYM SCI	1.395	3854	6599	1.71

Rank	Journal Title	2012 Impact Factor	Number of Articles from 2011-2012	Their Citations in 2013	2013 Impact Factor
41	POLYM J	1.496	307	522	1.70
42	J POLYM ENVIRON	1.495	239	390	1.63
43	INT J POLYM ANAL CH	1.233	114	186	1.63
44	IRAN POLYM J	1.053	177	282	1.59
45	J PHOTOPOLYM SCI TEC	0.984	149	227	1.52
46	POLYM COMPOSITE	1.482	488	739	1.51
47	POLYM BULL	1.332	495	730	1.47
48	POLYM ENG SCI	1.243	587	858	1.46
49	J BIOMAT SCI-POLYM E	1.7	297	429	1.44
50	FIBER POLYM	0.912	362	423	1.17
51	J REINF PLAST COMP	0.902	336	390	1.16
52	J INORG ORGANOMET P	1.174	325	372	1.14
53	HIGH PERFORM POLYM	0.85	155	155	1.00
54	J CELL PLAST	0.755	56	53	0.95
55	J VINYL ADDIT TECHN	1.107	73	59	0.81
56	J MACROMOL SCI A	0.807	273	211	0.77
57	POLYM SCI SER A+	0.669	242	172	0.71
58	ACTA POLYM SIN	0.677	415	288	0.69
59	INT J POLYM SCI	0.765	87	59	0.68
60	KOREA-AUST RHEOL J	1.015	68	45	0.66

APPENDIX 8

2010-2014 ARTICLES by Selected Topics



*All data taken from ISI-WOS 23.06.2014

APPENDIX 9

Publications/citations of the SKM

“Consistent values of rate parameters in free radical polymerization systems” 160 → 161 citations

M. Buback, L. H. Garcia-Rubio, R. G. Gilbert, D. H. Napper, J. Guillot, A. E. Hamielec, D. Hill, K. F. O'Driscoll, O. F. Olaj, J. Shen, D. Solomon, G. Moad, M. Stickler, M. Tirrell, M. A. Winnik, *J. Polym. Sci., Polymer Letters Ed.* **26**, 293-297 (1988).

“Consistent values of rate parameters in free radical polymerization systems. Part II: Outstanding dilemmas and recommendations” 190 → 200 citations

M. Buback, R. G. Gilbert, G. T. Russell, D. J. T. Hill, G. Moad, K. F. O'Driscoll, J. Shen, M. A. Winnik, *J. Polym. Sci., Polym. Chem. Ed.* **30**, 851-863 (1992).

“Consistent values of rate parameters in free-radical polymerization systems” 31 → 36 citations

R. G. Gilbert, *Pure App. Chem.* **64**, 1563-1567 (1992).

“Critically evaluated rate coefficients for free-radical polymerization,

1. Propagation rate coefficients for styrene” 487 → 526 citations

M. Buback, R. G. Gilbert, R. A. Hutchinson, B. Klumperman, F.-D. Kuchta, B. G. Manders, K. F. O'Driscoll, G. T. Russell, J. Schweer, *Macromol. Chem. Phys.* **196**, 3267-3280 (1995).

“Critically evaluated rate coefficients for free-radical polymerization,

2. Propagation rate coefficients for methyl methacrylate” 364 → 400 citations

S. Beuermann, M. Buback, T. P. Davis, R. G. Gilbert, R. A. Hutchinson, O. F. Olaj, G. T. Russell, J. Schweer, A. M. van Herk, *Macromol. Chem. Phys.* **198**, 1545-1560 (1997).

“Critically-evaluated propagation rate coefficients in free radical polymerizations.

1. Styrene and methyl methacrylate” 101 → 106 citations

R. G. Gilbert, *Pure Appl. Chem.* **68**, 1491-1494 (1996).

“Critically evaluated rate coefficients for free-radical polymerization -

3. Propagation rate coefficients for alkyl methacrylates” 138 → 162 citations

S. Beuermann, M. Buback, T.P. Davis, R.G. Gilbert, R.A. Hutchinson, A. Kajiwarra,

B. Klumperman, and G.T. Russell, *Macromol. Chem. Phys.* **201**, 1355-1364 (2000).
“Critically evaluated rate coefficients for free-radical polymerization, 4. Propagation rate coefficients for methacrylates with cyclic ester groups” 52 → 61 citations

S. Beuermann, M. Buback, T. P. Davis, N. García, R. G. Gilbert, R. A. Hutchinson, A. Kajiwara, M. Kamachi, I. Lacík, G. T. Russell, *Macromol. Chem. Phys.* **204**, 1338-1350 (2003).
“Critically evaluated rate coefficients for free-radical polymerization, 5. Propagation rate coefficient for butyl acrylate” 145 → 190 citations

J. M. Asua, S. Beuermann, M. Buback, P. Castignolles, B. Charleux, R. G. Gilbert, R. A. Hutchinson, J. R. Leiza, A. N. Nikitin, J.-P. Vairon, A. M. van Herk, *Macromol. Chem. Phys.* **205**, 2151-2160 (2004).
“Critically evaluated rate coefficients for free-radical polymerization, Part 6. Propagation rate coefficient of methacrylic acid in aqueous solution” 24 → 30 citations

S. Beuermann, M. Buback, P. Hesse, F.-D. Kuchta, I. Lacík, A. M. van Herk, *Pure Appl. Chem.* **79**, 1463-1469 (2007).
“Determination of the Propagation Rate Coefficient of Vinyl Pivalate based on EPR Quantification of Propagating Radical Concentration” 1 → 1 citation

N. Kubota, A. Kajiwara, P. B. Zetterlund, M. Kamachi, J. Treurnicht, M. P. Tonge, R. G. Gilbert, B. Yamada, *Macromol. Chem. Phys.* **208**, 1403-1411 (2007).
“Critically evaluated rate coefficients for free-radical polymerization, 7. Secondary-radical propagation rate coefficient for methyl acrylate in bulk” 0 → 2 citations

C. Barner-Kowollik, S. Beuermann, M. Buback, P. Castignolles, B. Charleux, M. L. Coote, R. A. Hutchinson T. Junkers, I. Lacík, G. T. Russell, M. Stach, A. M. van Herk, *Polym. Chem.* **4**, 204-212 (2014).
“Critically evaluated termination rate coefficients for free-radical polymerization – 1. The current situation” 102 → 115 citations

M. Buback, M. Egorov, V. Kaminsky, O. F. Olaj, G. T. Russell, P. Vana, G. Zifferer, *Macromol. Chem. Phys.* **203**, 2570-2582 (2002).
“Critically evaluated termination rate coefficients for free-radical polymerization, 2. Experimental methods” 66 → 78 citations

C. Barner-Kowollik, M. Buback, M. Egorov, T. Fukuda, R. G. Gilbert, A. Goto, G. T. Russell, P. Vana, B. Yamada, P. B. Zetterlund, *Prog. Polym. Sci.* **30**, 605-643 (2005).
“Mechanism and Kinetics of Dithiobenzoate-Mediated RAFT Polymerization, 1. The Current Situation” 224 → 274 citations

C. Barner-Kowollik, M. Buback, B. Charleux, M. L. Coote, M. Drache, T. Fukuda, A. Goto, B. Klumperman, A. B. Lowe, J. B. McLeary, G. Moad, M. J. Monteiro, R. D. Sanderson, M. P. Tonge, P. Vana, *J. Polym. Sci. Polym. Chem.* **44**, 5809-5831 (2006).
“Mechanism and kinetics of dithiobenzoate-mediated RAFT polymerization” 2. Status of the dilemma

G. Moad, *Macromol. Chem. Phys.* **215**(1), 9-26 (2014)