

**IUPAC POLYMER DIVISION MEETING**  
**46<sup>th</sup> MACRO**  
**July 16/17, 2016**  
**09:00-17:30**  
**09:00-12:30**  
**ITÜ University, Marslak Campus, Istanbul, Turkey**

**Those attending:** Rameshwar **Adhikari** (Nepal) NR, Michael **Buback** (Germany) Division Past President, Paola **Carbone** (Italy) observer Chin Han **Chan** (Malaysia) NR, Claudio **dos Santos** (Brazil) NR, Christopher **Fellows** (Australia) SPED, Jiasong **He** (China) TM, Michael **Hess** – Acting Division Secretary (Germany), Roger **Hiorns** (France) TM, Igor **Lacik** (Slovakia) TM, Stefano Valdo **Meille** (Italy) member, Jan **Merna** (Czech Republic) observer, Olga **Philippova** (Russia) NR, Guido **Raos** (Italy), Greg **Russell** – Division President (New Zealand), Stanislaw **Slomkowski** (Poland) SPT, Natalie **Stingelin** (UK) SPT, Patrick **Theato** (Germany) SPED, Paul **Topham** (UK) SPT, Cem **Tuncel** (Turkey) observer, Yusuf **Yagci** (Turkey) TM

**Saturday, 16.07.2016**

**1. President's Introductory Remarks and Finalization of the Agenda (Appendix 1)**

The Division President Greg Russell welcomed the Division members, observers and guests. The previously distributed agenda was accepted, in-process changes applied due to recent political events (terror attack at the Istanbul Airport on the 28<sup>th</sup> of June 2016 and the attempted military coupe on the 15<sup>th</sup> of July 2016)–see Appendix 1.

Due to the dramatic events during the night 15./16.07., the performance of the 46<sup>th</sup> IUPAC MACRO seemed to be endangered and the question occurred whether or not the Conference should be cancelled. After detailed discussion and considering the development of the situation Division IV strongly supported the Chair of the Conference, Yusuf Yagci, and recommended to hold the Conference.

Greg Russell recalled and honoured the members of the Division who have deceased during the recent years, namely Irene Schnöll-Bitai, François Schue, Ron Sanderson, Ernest Marechal, Bob Stepto and in May 2016 Bob Fox<sup>1</sup>. We badly miss them all.

There is now a **Bob Stepto Plenary Lecture** at each IUPAC MACRO starting with the 46<sup>th</sup> IUPAC MACRO in Istanbul, and it comes with a plaque for the lecturer, see also 11.6.

Yusuf Yagci gave the recent information about the Conference. The Conference was shortened by 2 days and performed without further problems. Shuttle services were in place and the local organizers did a brilliant job to give any assistance to finally make the conference a success despite all difficulties and uncertainties in the beginning and although only a fraction (672 registered) of the anticipated participants (~1200) could come to Istanbul.<sup>2</sup>

Greg Russell addressed the retirement of Dick Jones<sup>3</sup> and Werner Mormann from the Division and thanked them for their long and fruitful participation in the Division's business.

**2. Apologies for Absence**

Absent members sent their apologies together with greetings to the Division, namely Dietmar **Auhl**, Maximo **Baron**, Ray **Boucher**, Jiazhong **Chen**, Alain **Fradet**, Bob **Gilbert**, Karl-Heinz **Hellwich**, Voravee **Hoven**, Chain-Shu **Hsu**, Jung-Il **Jin**, Doo-sung **Lee**, Christine **Luscombe** (Division Vice-President), Mario **Malinconico**, Graeme **Moad**, Sabine **Beuermann**, Phil **Hodge**, Robin **Hutchinson**, Dick **Jones**, Pavel **Kratochvil**, Tamaki **Nakano**, Graeme **Moad**, Christopher **Ober**, Mitsuo **Sawamoto**, Martine **Stenzel**, Adriana **Sturcova**, Sebastien **Perrier**, Malcolm **Purbrick**, Michel **Vert**, Jean-Pierre **Vairon**, Jiri **Vohlidal**, Michael **Walter** (Division Secretary), Martin **Walker**, and Ted **Wilks**. Many of those mentioned above could not attend because of last minute travel restrictions from their country, company or university or cancelled flights because of the political situation at the time.

**3. Approval of the Minutes of the Division Committee Meeting, Busan, August 2015**

The minutes recorded from the 2015 meeting in Busan, South Korea, were accepted without any dissenting vote.

**4. Report Interdivisional Subcommittee Materials Chemistry (ISMC) (Natalie Stingelin)**

Summary of the results of the ISMC meeting during the 45<sup>th</sup> IUPAC GA, Busan 10.08.2015 and its aftermath:

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<sup>1</sup> This became known only at the end of the year 2016 through a private communication

<sup>2</sup> The Conference was finally performed with the common quality and unaffected by the aftermath of the coup. It was only on a smaller scale, and parts of the social program were cancelled. Eventually, participants and organizers agreed that the Conference was a great success despite the initial problems and accomplished by the brilliant job the local organizers did untiringly.

<sup>3</sup> Dick Jones is still involved in the distribution of the travel support to the Division meetings

- 1) There was agreement that there will be a rotation of chairs at the next GA and a representative of Division I (Physical and Biophysical Chemistry), one of the founding divisions, will take on a 4-year term.
- 2) The ISMC will serve not only to foster materials chemistry within IUPAC but will also act to catalyse interdivisional activities.
- 3) The MC education website will receive input from all present at the ISMC meeting and update the content before the next meeting of the ISMC.
- 4) The ISMC meeting will be held once at the GA and 3 times electronically (e.g. Skype) during the next biennium.
- 5) All present will be solicited for interdivisional terminology and other projects during the next 2 months
- 6) One or more interdivisional workshops will be planned for the next GA/WCC to foster a better understanding of the activities between divisions that might cooperate on ISMC projects.

Possible goals that ISMC might focus on in its future activities include:

- Creating a common language of chemistry
- Better reaching the developing world
- Exciting the public about chemistry and its benefit to society (materials chemistry in particular is excellent for that)
- Use the Centenary to grow resources for ISMC

Chris Ober has arranged the following for the 46<sup>th</sup> GA in Brazil 2017:

- Chris Ober has contacted Brazil organizers offering to provide advice on materials chemistry talks and Chris is co-organizing a symposium on polymer materials.
- work moving ahead on Materials Chemistry Education Website that is now in the process of being moved to IUPAC server.
- Chris will be co-organizing the WCLM meeting. With it will be an interdivisional workshop on opportunities between divisions focused on materials chemistry and sustainable, green chemistry.
- at Brazil, ISMC leadership will go to Physical Chem division.

At the present time there is only one project, namely the ISMC Materials Chemistry website (Project No. 2013-037-1-200). The current website address is: <http://iupac-materials.chem.utah.edu>

In order to move forward, the ISMC needs new projects, ideas are to be active in the fields: energy, sustainability, health, electronics or nanotechnology

The different recently developed 'short guides and terminologies of i) polymers (published), ii) inorganic materials - "small red book" about to appear, should be included in the website and iii) the languages available on the educational website shall be increased. For the short term any website will likely be in English but in the long term the project should be expanded to involve a choice of other languages. A long-term project is for the website to include other languages like the Division IV Glossary of Polymer terminology.

## 5. Report Subcommittee Polymer Terminology - SPT (Roger Hiorns)

The communication platform (library and file exchange) 'redmine' has been activated: <https://redmine.univ-pau.fr>  
For instructions on use, see [http://www.iupac.org/fileadmin/user\\_upload/divisions/IV/401/IV1\\_14min.pdf](http://www.iupac.org/fileadmin/user_upload/divisions/IV/401/IV1_14min.pdf)

### 5.1 Project Statuses at the start of the week

**2016-050-3-400** *Definition of Terms Pertaining to Polymers in the Solid State: Molecular Arrangement from the Nano- to the Micrometer Scale* - Stingelin

Work in progress.

**2015-049-1-400** *Brief Guide to the Characterisation of Polymers* - Hess

Project has not yet been granted and leadership taken over by Paul Topham.

**2015-032-2-400** (Project Committee) *Synchronizing Wikipedia: Polymer Definitions and Terminology* – Hess

Work in progress.

**2013-049-1-400** *Terminology on the Separation of Macromolecules* – Hess

Work in progress.

**2013-001-1-800** *Structure-based Nomenclature for Regular Linear Star, Comb and Brush Polymers* - Chen

Work in progress. The team need to finalize the document and then send it to SPT.

**2010-036-1-400** *Keywords* – Slomkowski

Work in progress.

**2015-050-1-400** *Definition of Terms Relating to the Ultimate Mechanical Properties of Polymers* - Adhikari

The project will be updated.

**201x-xxx-1-400** (Project Committee) *Development of a Multilingual Glossary of Polymer Terminology with New Languages* - dos Santos

The project is in a ‘transitional phase’, having translated terms into Western languages, the team was now to look at character-based languages (but this worked had not yet been started). It was stated that the links within IUPAC website issues have to be identified.

**2012-048-2-400** *A Brief Guide to Polymer Terminology* - Hiorns

Work in progress.

## **5.2 Invited Lecture and Discussion**

Terminology Through the Looking Glass, Michael Hess

Michael Hess gave lecture to give history, guidance and advice on SPT and Division IV activities.

Jiasong He stated how important it is that we continue to strongly represent the polymer culture and community. The consideration of both terminology and nomenclature should reflect the cultural strengths of our world-wide community.

Roger Hiorns mentioned that the recently accepted Source-Based Nomenclature (2003-042-1-800 Source-based nomenclature – Jones) document is very important to meet with the needs of the polymer community, it is a major document in terms of polymer nomenclature. It also meets the expectations of the Nomenclature Division (VIII), and indeed we cooperate with them as close as possible.

Because of the proximity and overlap with CAS nomenclature, somebody from CAS should be invited to Brazil in 2017. In the past the late Val Metanowski was the CAS representative for many years.

## **5.3 Project Statutes and Actions following work in SPT**

**2015-014-1-400** *Guide (and Brief Guide) to Polymer Semiconductors* - Michael Walter

Work in progress

**2014-033-1-400** *Nomenclature and terminology relevant to lactic acid-based polymers: synthesis, structure, properties, applications and degradation* - Michel Vert, Jiazhong Chen.

Work in progress, discussion part has to be shortened, comments are called in.

**2016-xxx-1-400** (Project Committee) *Development of a Multilingual Glossary of Polymer Terminology with New Languages* - Claudio dos Santos.

The IT group of IUPAC needs to be more involved (using their server for security, for example). The team were previously using a word document/table for use in this project, but maybe excel will be better. Presently, there is only have one translator for each language, but a system is needed to allow access to more than one translator for each language, using date stamps, for example. This is an expensive project. This needs to be discussed with Dr. F. Meyer to find out if the site can be housed within IUPAC and whether or not internal web-engineers might help. A question that was raised: “Can we get DIV IV people to lobby this project to IUPAC?” CdS surmised that this is a really important project that has been shown to work.

Roger Hiorns invited Claudio dos Santos to write to Dr. F. Meyer with respect to enabling IUPAC web-hosting and technical support to reduce costs, and that he would strongly support funding for this project which was a flagship for SPT with a follow-up mail.

**2015-013-1-400** *Brief Chain: Brief Guide to Polymerization Terminology* - Christine Luscombe. Work in progress focusing on polymerization mechanisms in this brief guide.

**2016-018-1-400** *Brief Guide to Polymer Microstructure* - Natalie Stingelin.

The team started the project after positive response from the referees and collected 180 terms, focusing on terms that cause problems in multidisciplinary research. In the future, the team will plan a Brief Guide with hyperlinks (this could be a new project).

**2013-001-1-800** *Structure-based nomenclature for regular linear star, comb and brush polymers* - Jiazhong Chen.

Work in progress, finalization of the project assumed by the end of 2016.

**2009-047-1-400** *Definitions and notations relating to stereochemical aspects in polymer science* Chris Fellows.

Work in progress.

**2015-050-3-400** *Definition of terms relating to the ultimate mechanical properties of polymers* -

Rameshwar Adhikari.

Work in progress, a draft will be prepared for July 2017 in Brazil.

**2014-033-1-400** (Project Committee) *Polymeric Carriers: Nomenclature for polymeric carriers bearing chemical entities with specific activities and names* - Jiazhong Chen, Michel Vert.

Work in progress.

**2016-050-3-400** *Definition of Terms Pertaining to Polymers in the Solid State: Molecular Arrangement from the Nano- to the Micrometer Scale* - Natalie Stingelin.

The team finished the document after some amendments. A document will be sent to Roger Hiorns by the beginning of 2017.

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

Work in progress. A document will shortly be sent to Roger Hiorns and then to external experts.

**2015-032-2-400** (Project Committee) *Synchronizing Wikipedia: Polymer Definitions and Terminology* - Michael Hess.

Work in progress.

**2010-036-1-400** *Keywords* - Stan Slomkowski.

By September, the final draft will be circulated to SPT for final approval.

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

Work in progress. First draft by July 2017 SPT in Brazil.

**2012-048-2-400** *A Brief Guide to Polymer Terminology* - Roger Hiorns.

Work in progress. Next draft expected for the Brazil meeting.

#### **5.4 Future Projects**

Development of a Multilingual Glossary of Polymer Terminology with New Languages (Project Committee) project for submission.

#### **5.5 Length of Chair of SPT-Chair Service**

The Bureau decided that the Chair should stay as long as he/she has support from SPT. The Bureau recommended that there should not be a regular election, but a monitoring process (collecting opinions across SPT). It was agreed that a review every two years would be reasonable. Michael Hess commented that the Chair of the SPT should have a vote in the Division, that there should not be any rule that the Chair must come from a given part of the world and that the Chair should be selected as the best person for the job.

#### **5.6 The following projects were published or have been accepted for publication:**

##### **#2005-005-2-400 Solutions – Stepto**

*'Definitions of terms relating to individual macromolecules, macromolecular assemblies, polymer solutions, and amorphous bulk polymers (IUPAC Recommendations 2014)'*, R. Stepto, T. Chang, P. Kratochvíl, M. Hess, K. Horie, T. Sato, J. Vohlidal, *Pure Appl. Chem.* **2015**; 87(1): 71–120.

##### **#1999-051-1-800 Modified – Jones**

*'Nomenclature and graphic representations for chemically modified polymers (IUPAC Recommendations 2014)'*, R. G. Jones, T. Kitayama, E. S. Wilks, R. B. Fox, A. Fradet, K.-H. Hellwich, M. Hess, P. Hodge, K. Horie, J. Kahovec, P. Kratochvíl, P. Kubisa, E. Maréchal, W. Mormann, C. K. Ober, R. F. T. Stepto, M. Vert, J. Vohlidal, *Pure Appl. Chem.* **2015**; 87(3): 307–319.

##### **#2011-013-2-400 Updating Wikipedia – Hess**

Published through numerous Wikipedia pages now carrying IUPAC definitions.

##### **#2007-008-1-400 Multilingual Encyclopedia – dos Santos**

Published as a Multilingual Polymer Glossary at:

<http://www.iceb.ufop.br/dequi/iupac/polymerglossary/index.php>

**Purple Book (PB2) was made freely available at:**

[http://www.iupac.org/fileadmin/user\\_upload/publications/e-resources/ONLINE-IUPAC-PB2-Online-June2014.pdf](http://www.iupac.org/fileadmin/user_upload/publications/e-resources/ONLINE-IUPAC-PB2-Online-June2014.pdf)

##### **#2003-042-1-800 Source-based nomenclature – Jones**

To be published as, *'Source-based Nomenclature for Single-Strand Homopolymers and Copolymers (IUPAC Recommendations 2016)'*, R. G. Jones, T. Kitayama, K.-H. Hellwich, M. Hess, A. D. Jenkins, J. Kahovec, P. Kratochvíl, I. Mita, W. Mormann, C. K. Ober, S. Penczek, R. F. T. Stepto, K. Thurlow, J. Vohlidal, E. S. Wilks, *Pure Appl. Chem.* **2016**.

#### **5.7 The following project is currently in public review:**

**# 2008-015-1-400:** *Preferred names for polymers*

#### **5.8 The following projects are expected to be sent to public review in the next few months:**

**# 2001-081-1-800:** *Terminology and structure-based nomenclature of dendritic and hyperbranched polymers*

**# 2009-047-1-400:** *Definitions and notations relating to stereochemical aspects in polymer science*

**# 2008-020-1-400:** *Revision of the web-based guide, IUPAC Recommendations on Macromolecular Nomenclature – Guide for Authors of Papers and Reports in Polymer Science and Technology*

# 2010-036-1-400: *Keywords in polymer science journals* – Slomkowski

#### 5.9 The following projects are in preparation:

# 2006-028-1-400: *Terminology for conducting, electro-active and field-responsive polymers* – Vohlidal

# 2010-007-1-400: *Terminology for chain polymerizations* – Moad

# 2011-035-1-800: *Terminology and nomenclature of inorganic and coordination polymers (TINCOPS) – a extended revision of Nomenclature for regular single-strand and quasi-single-strand inorganic and coordination polymers (1984)* – Jones

# 2012-001-1-400: *Terminology of nanomaterials and nanotechnology in polymer science* – Ober & Jones

# 2012-048-3-400: *Brief guide to polymer terminology* – Hiorns

# 2013-001-1-800: *Structure-based nomenclature for regular linear star, comb and brush polymers* – Chen

# 2014-014-1-400: *Terminology for Modeling and Simulation of Polymers* – Meille

# 2014-034-2-400 (Project Committee): *Nomenclature for polymeric carriers bearing chemical entities with specific activities and names* – Vert

# 2014-033-1-400: *Nomenclature and terminology relevant to lactic acid-based polymers: synthesis, structure, properties, applications and degradation* (Extension of 2012-042-1-400) – Vert

#### 5.10 Projects that have recently been accorded funding or extension or both:

# 2015-013-1-400: *Brief guide to polymerization terminology* – Luscombe & Moad

# 2015-014-1-400: *Guide (and brief guide) to polymer semiconductors* – Walter

# 2015-032-2-400: (Project Committee) *Synchronizing Wikipedia: polymer definitions and terminology* – Hess

# 2013-049-1-400: *Terminology on separation of macromolecules* – Hess

# 2015-050-3-400: *Definition of terms relating to the ultimate mechanical properties of polymers* – Adhikari

# 2016-018-1-400: *Definition of Terms Pertaining to Polymer in the Solid State: Molecular Arrangement from the Nano- to the Micrometer Scale* – Stingelin

#### 5.11 Projects submitted or close to submission to IUPAC for funding:

# 2015-049-1-400: *Brief Guide to the Characterisation of Polymers* – Topham

#2016-XXX-1-400: *Development of a multilingual glossary of polymer terminology with new languages* (Project Committee) – dos Santos

#### 5.12 Projects under discussion for submission:

- http of PB2 Moad
- Renewable and recycled polymers Vairon
- Terminology for constitutionally-dynamic polymers Vohlidal
- Polymers for bioelectronics Walter
- Polymers for 3D printing Walter
- Ionic liquids/polymer inorganic devices Ober
- Mediatized terms dos Santos
- Modified extended short hand names Vert

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

To operate an international network of scientists whose interests lie within the broad field of structure and properties of commercial polymers.

Drivers of this activity are its members and their motivation to obtain value (to them and their business) from participation in the group.

The Sub-committee initiates projects that it knows are of relevance and importance. The balanced membership base from industry and academy works in a manner to ensure that the projects are structured in such a way as to accommodate value in application, need and scientific novelty. Also, in a general sense this has to be convincing to their paymasters who are their industrial managers or academic supervisors. It is therefore obligatory to ensure that the appropriate skills are present and active in the Sub-committee.

There is support from numerous companies all-over the world:

Arkema, BASF, Dow Benelux NV, Dutoit/Gunesin, Freudenberg, INEOS, Lanxess, Mitsui Chemicals, Sekisui, Chemicals, SK Energy, Ube Industries, Basell Polyolefine, Bayer MaterialScience, DSM, Evonik, Idemitsu Koson, Intertek, LG Chemical, Polyplastic, SINOPEC, Ticona, Winton Materials Science.

| Country        | Members | Industry | Academia |
|----------------|---------|----------|----------|
| China          | 13      | 3        | 10       |
| Czech Republic | 2       | 0        | 2        |
| Germany        | 9       | 7        | 2        |
| Italy          | 1       | 0        | 1        |
| Japan          | 10      | 3        | 7        |
| Korea          | 16      | 3        | 13       |
| Netherlands    | 3       | 2        | 1        |
| Poland         | 2       | 0        | 2        |
| Switzerland    | 1       | 1        | 0        |
| United Kingdom |         | 1        | 2        |
| Total          |         | 20       | 40       |

**2015 Subcommittee EA Meeting No. 73A**, November 4- 5, Busan, **Korea**, Hosted by Prof. Ha  
18 participants (academia 16/industry 2), from 3 countries

**2016 Subcommittee Meeting No. 74**, May 23-25, 2016, Rhodes, **Greece**, Hosted by Dr. Vittorias  
16 participants (academia 13/industry 3), from 9 countries

Subcommittee publications up to now:

[91] K. Wang, e.a., J. Appl. Polym. SCI., 129: 4 (2013).

*Effect of Polytetrafluoroethylene on the Foaming Behaviors of Linear Polypropylene in Continuous Extrusion*,

[92] M. Laun, e.a., Pure Appl. Chem., 86: 1945–1968 (2014).

*Guidelines for checking performance and verifying accuracy of rotational rheometers: viscosity measurements in steady and oscillatory shear* (IUPAC Technical Report),

Publication Summary

- Published in *Pure Appl. Chem.* 58 papers
- Total citations: 1673; > 200 citations: 1; > 100: 3; > 25: 18.

### Currently Running Official Projects

#### # 2007-004-1-400

*Guidelines for shear rheometer calibration and performance check:*

Dr. Ulrich Handge, Helmholtz-Zentrum Geesthacht, Germany

#### # 2008-028-1-400

*Elongational rheometry devices for shear rheometers*

Dr. Dietmar Auhl, Maastricht University, The Netherlands

#### # 2010-019-1-400

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

Prof. Clive Bucknall, Cranfield University, United Kingdom

#### # 2007-004-1-400

*Guidelines for shear rheometer calibration and performance check*

Dr. Ullrich Handge, Helmholtz-Zentrum Geesthacht, Germany

One paper has been published:

*Pure Appl. Chem.*, 86: 1945–1968 (2014).

### To be completed officially:

#### # 2008-028-1-400

*Elongational rheometry devices for shear rheometers*

Dr. Dietmar Auhl, Maastricht University, The Netherlands

One draft to be submitted to *Physical Review* at the end of 2016.

To be closed officially

#### # 2010-019-1-400

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

Prof. Clive Bucknall

To be closed at the end of 2016, and to be a new one with the same title.

#### **Technical reports to be submitted to PAC**

- *Structure, processing and performance of UHMWPE:*  
*Part 1: Characterizing molecular weight (Draft in PDF)*
- *Structure, processing and performance of UHMWPE:*  
*Part 3: Deformation, wear and fracture*
- *Thermal Analysis, High-Pressure Crystallisation, Flash-DSC*
- *Micromechanics (entanglement and grain boundaries), indentation, creep compared to macromechanics*

#### **Feasibility Studies in Progress:**

- No. 9 Comparison between experiment and simulation of extrudate swell  
Zoetelief, Auhl: Vittorias, Handge, Kroll, Remerie, Slouf
- No. 10 The role of stress-induced cavitation in mechanical performance of semi-crystalline polymers  
Galeski, Bucknall: Altstädt, Dijkstra, Mangnus, Michler, Pukansky, Steininger, Vittorias, Zoetelief
- No. 15 Rheology of volatile systems  
Wassner: Mangus, Auhl, Dijkstra, Handge
- No. 16 Comparison of different CaBER (Capillary Breakup Extensional Rheometer) devices  
Wassner: Dijkstra, Vervoort
- No. 17 Morphology formation of polymer blends determined by non-linear rheology  
Wassner:
- No. 18 Structure and Properties of Thermoplastic Polyurethanes (TPU)  
Dijkstra: Wassner/Susoff, Auhl
- No. 19 Deformation behavior of neck forming polymers  
Hobeika: Galeski, Vittorias, Nitta, Wu, He/Men, Auhl
- No. 22 Structure and properties of polylactide  
Chen: Auhl, Ha, He, Kim, Hu, Chung, Inoue, Liu, Slouf, Wu, di Lorenzo, Galeski
- No. 23 Structure, Properties, and Performance of Polyetheretherketone (PEEK)  
Wu: Slouf, Auhl, Henning, Kalloudis, He
- No. 24 Structure and Properties of biobased Polyketone (PK)  
Ha, Lim: Nitta, Wang, Lee, He, Hu, Auhl, Dijkstra, Wu, Slouf
- No. 25 Correlation of Micro- and Macro-Mechanical Properties and Structure for high demanding applications  
Auhl, Vittorias: Kalloudis, Slouf, Vackova, Vervoort, Wu
- No. 26 Additives for Polyolefin Degradation  
Malinconico: Vittorias, Wu, Auhl, Vervoort, Kalloudis
- No. 27 Transparent polypropylene with low extractable solubles  
Qiao, Guo: Vittorias, Ha, Nitta, Tokumitsu, Hu, Meng, Wang
- No. 28 Antimicrobial Polymers  
Qiao, Guo: Vittorias

#### **new feasibility study:**

*Elongational flow behavior of commercial and molded polymers.*

#### **Next meetings**

- 2016 Subcommittee EA Meeting No. 74A, November 17- 18, 2016, Hikone, Japan  
Hosted by Prof. Dr. Tokumitsu
- 2017 Subcommittee Meeting No. 75, April or May 2017, Łódź, Poland  
Hosted by Prof. Galeski

#### **7. Subcommittee Modelling of Polymerization Kinetics and Processes - SKM (Greg Russell on behalf of Sabine Beuermann)**

There are 44 members from 16 countries: Australia, Germany (8), France, Japan (6), USA (3), Belgium, Canada (2), Netherlands, New Zealand, Russia, UK, Italy, Singapore, Spain, Slovakia, South Africa (1). Of these are from industry (5), research institutes (3), university (36).

#### **Continuing Projects:**

- Vinyl ester propagation                      close to be finished
- Initiation rate parameters                      close to be finished
- NMP rate parameters
- Styrene polymerization rate parameters
- Chain-length dependent termination

## New project

- EPR spectra of important polymerization-related radicals

### Projects and their status

#### # 2009 – 050 – 1 – 400

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

An extensive review by Graeme on azo initiators has been accepted for publication in Prog. Polym. Sci. in May 2016.

A summary of the kinetic data for PAC will be prepared.

#### # 2013 – 045 – 1 – 400

*Critically evaluated rate coefficients for vinyl ester propagation*

Project is close to be finalized. The manuscript was written and feedback of two group members is waited for.

#### # 2010 – 027 – 2 – 400

*Critically evaluated dissociation rate coefficients for alkoxyamines*

Gathering data for 2,2,6,6-tetramethyl-1-piperidinyloxy radical (TEMPO) and N-tert-butyl-N-(1-diethylphosphono-2,2-dimethylpropyl) nitroxide (SG1). After change in taskgroup leader and a longer leave from work the project was restarted at Pacifchem 2015. Dagmar D'Hooze was added as new taskgroup member. Data collection and distribution among taskgroup is currently under way. Gathering data for 2,2,6,6-tetramethyl-1-piperidinyloxy radical (TEMPO) and N-tert-butyl-N-(1-diethylphosphono-2,2-dimethylpropyl) nitroxide (SG1). After change in taskgroup leader and a longer leave from work the project was restarted at Pacifchem 2015. Dagmar D'hooze was added as new taskgroup member. Data collection and distribution among taskgroup is currently under way.

#### # 2013 – 047 – 1 – 400

*Critically evaluated rate coefficients for radical polymerization of styrene*

Work was delayed due to very high teaching load of Sabine Beuermann.

Recently, Dagmar D'Hooze joined the project, since she works on modeling of styrene polymerizations and is very well aware of the existing data. Meeting of some task group members is planned for fall in Germany.

#### # 2013 – 051 – 1 – 400

*Critically evaluated rate coefficients for chain-length-depending termination in radical polymerization*

New CLDT data from SP-PLP-ESR published by Buback e.a., data collection started.

#### # 2015 – 034 – 1 – 400

*Critically evaluated ESR (EPR) spectra of important polymerization-related radicals*

Project announcement published in Chem. Int. March 2016, p. 21.

### Future Project Ideas

- Critically evaluated rate coefficients for backbiting (most data for butyl acrylate available)
- 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

### Publications and Citations see Appendix 2

## 8. Report Sub-Committee on Polymer Education – SPed (Chris Fellows, Patrick Theato)

The structure of the SPed is now:

Co-Chairs: Christopher Fellows (Australia), Patrick Theato (Germany)

Elected Members: Rigoberto Advincula (USA), Choon Do (ROK), Claudio dos Santos (Brazil), Chan Chin Han (Malaysia), Jiasong He (PRC), Michael Hess (Germany), Dhanjay Jhurry (Mauritius), Richard Jones (UK), Christine Luscombe (USA), Graeme Moad (Australia), Gregory Russell (NZ)), Jiří Vohlídal (Czech), Michael Walter (USA)

### List of "activities and achievements during 2014-2015 biennium and the first part of 2016"

Support for and operation of 1-day workshops on polymer characterisation associated with the Polychar World Forum on Advanced Materials in 2014 (April, Stellenbosch, South Africa), 2015 (May, Lincoln, Nebraska, USA) and 2016 (May, Poznan, Poland).

Support for and operation of a postgraduate course in polymer science at the Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Prague, in the 2013-2014, 2014-2015, and 2015-2016 academic years.

Organisation of a polymer education symposium as a component of the MACRO 2014 conference (2014 July, Chiang Mai, Thailand) and of a volume of Macromolecular Symposia aggregating the research presented at this symposium.

Organisation of a polymer education symposium as a component of the MACRO 2016 conference (2016 July,

Istanbul).

Enhancement and extension of the IUPAC Polymer Education website.

Incorporation of IUPAC-consistent material in Wikipedia articles related to polymer chemistry.

Organisation of a half-day polymer education workshop in association with the MACRO 2016 conference (2016 July, Istanbul).

**- Outputs/publications over this period**

Hess, M. and Walker, M., Synchronizing Polymer Definitions and Terminology with Wikipedia, M. Hess and M. Walker, Chemistry International. 36(2), 19. DOI: 10.1515/ci.2014.36.2.19, March 2014

Macromolecular Symposia, 355, World Polymer Congress – MACRO 2014, Volume on Polymer Education, W. Mormann Ed. DOI: 10.1002/masy.201570035, September 2015 (17 publications, listed below)

Amornsakchai, T., University Polymer Education in Thailand. Macromol. Symp., 355(1), 82-89, (2015). doi: 10.1002/masy.201500038

Chan, C. H., and Ho, C.-C. Polymer Education of Public Universities in Malaysia. Macromol. Symp., 355(1), 75-81, (2015). doi: 10.1002/masy.201500059

Do, C. H., and Theato, P. Update on Polymer Education in Korea. Macromol. Symp., 355(1), 68-74, (2015). doi: 10.1002/masy.201500088

dos Santos, C. G., Dias, M. L., and Canevarolo, S. V. Polymer Education in Brazil: Present Situation. Macromol. Symp., 355(1), 111-118, (2015). doi: 10.1002/masy.201500071

Edmonds, N. R., McKee, J., and Plimmer, P. N. Commercial Plastics: Tertiary Level Postgraduate Education in New Zealand. Macromol. Symp., 355(1), 39-42, (2015). doi: 10.1002/masy.201500035

Enlow, J. L., Marin, D. M., and Walter, M. G. Developing a Polymer Semiconductor Education Kit and Curriculum for High School Science Classrooms. Macromol. Symp., 355(1), 43-51, (2015). doi: 10.1002/masy.201500079

Fellows, C. M. Polymer Education in Australia. Macromol. Symp., 355(1), 104-110, (2015). doi: 10.1002/masy.201500066

He, J. Polymer Education in Institute of Chemistry, Chinese Academy of Sciences. Macromol. Symp., 355(1), 52-60, (2015). doi: 10.1002/masy.201500028

Hess, M. Conference Tutorials as Educational Tool in Polymer Science: The POLYCHAR Conference and Short Course. Macromol. Symp., 355(1), 26-31, (2015). doi: 10.1002/masy.201500044

Hiorns, R. C. Terminology and Nomenclature: A Prerequisite or Nuisance for Polymer Science Education? Macromol. Symp., 355(1), 13-19, (2015). doi: 10.1002/masy.201500052

Mormann, W. Polymer Education – A Matter at the Heart of the IUPAC Polymer Division. Macromol. Symp., 355(1), 8-12, (2015). doi: 10.1002/masy.201500094

Nakano, T. Polymer Education in Japan. Macromol. Symp., 355(1), 61-67, (2015). doi: 10.1002/masy.201500019

North, A. M. Teaching from Polymer Molecular Structure to Technological Properties; Requirements in Developing Countries. Macromol. Symp., 355(1), 32-38, (2015). doi: 10.1002/masy.201500037

Pasch, H. Polymer Science Education – A (Southern) African Perspective. Macromol. Symp., 355(1), 96-103, (2015). doi: 10.1002/masy.201500029

Šturcová, A., and Kratochvíl, P. UNESCO/IUPAC Postgraduate Course in Polymer Science – Prague, Czech Republic. Macromol. Symp., 355(1), 20-25, (2015). doi: 10.1002/masy.201500016

Theato, P., Polymer Education in Germany. Macromol. Symp., 355(1), 119-125, (2015). doi: 10.1002/masy.201500055

Van Thu, L., Van Khoi, N., and Tung, N. T. Polymer Education in Vietnam. Macromol. Symp., 355(1), 90-95, (2015). doi: 10.1002/masy.201500068

**- Meetings over this period (dates, location, occasion, number of attendees [names also if you want])**

July 4<sup>th</sup> 2014, Chiang Mai, MACRO-2014, 12 attendees

August 9<sup>th</sup> 2015, Busan, 48<sup>th</sup> IUPAC General Assembly, 17 attendees

**- IUPAC projects over this period, indicating which have been completed and which are still running (please give project number, title and project chair)**

#2012-027-3-400, *Enhancing Educational Website for Polymer Chemistry*, C. Ober, ongoing  
 #2013-046-1-400, *Postgraduate Course in Polymer Science*, P. Kratochvíl, complete  
 #2013-053-1-400, *Polymer Education*, W. Mormann, complete  
 #2015-032-2-400, *Synchronizing Wikipedia, Polymer Definitions and Terminology*, M. Hess, ongoing  
 statistics monitoring at: <http://stats.grok.se/>

#2015-046-1-400, *Postgraduate Course in Polymer Science*, P. Kratochvíl, ongoing

## 8 Reports on Graduate Courses/Tutorials

**Report on UNESCO/IUPAC Postgraduate Course in Polymer science**, Praha, Czech Republic (**Chris Fellows** replacing **Adriana Sturcova**)

One of the initiators of the Course is Professor Pavel Kratochvíl, one of the initiators and long-time Chair of the course, has also served as a director of the Institute and is a long-time member of IUPAC. The Course started in the year 1996, and until now there were 166 participants from 23 countries.

### Status in January 2016:

450 papers in international journals  
 more than 8000 citations  
 many conference contributions  
 1 patent

## Ph.D. STUDIES

32 Course graduates have started PhD degree studies at the universities in the Czech Republic in the last 12 years.

The program is supported by Marie Curie Fellowship and NATO Fellowship.

A. Štuncová, P. Kratochvíl *Macromol. Symp.* 355 (2015) 20–25

The program covers:

- RESEARCH WORK
- Lectures
- Language courses
- Seminars at the Institute
- Symposia in June or July of each year

In the 20th year (October 2015 to July 2016) there were 10 participants from 7 countries, namely: Cameroon (23rd country to join the Course), China, Nepal, Poland, Russia, Ukraine, Uruguay

#2014-040-1-400, *International Tutorial on Polymer Characterization - 24th POLYCHAR Short Course*, M. Hess, complete, see detailed report in *Chem Int* 38(6)(2016) 39, DOI: <https://doi.org/10.1515/ci-2016-0638>

## Report on International Tutorial on Polymer Characterization – 24th POLYCHAR (Michael Hess)

The 24th World Forum on Advanced Materials (POLYCHAR) (derived from Polymer Characterization) was hosted by Poznan University of Technology, Poznan, Poland, and organized by the Institute of Materials Technology of the Faculty of Mechanical Engineering and Management and the Faculty of Chemical Technology, 9-13 May 2016 ([www.polychar24.divisia.pl](http://www.polychar24.divisia.pl)). It is the policy of POLYCHAR to visit a different part of the world each year and to give, in particular, students and young scientists from all over the world an opportunity to present their scientific work to a larger international audience, to meet prominent scientists, and to attend a tutorial, or short course, held by international scientists.

The previous conferences had been in Denton, Texas, USA (where POLYCHAR was founded in the year 1992), Guimaraes, 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), Stellenbosch, South Africa (2014), and Lincoln, Nebraska, USA (2015). The 2016 Conference Short Course (tutorial) was supported by IUPAC and its Polymer Division via the HANWHA TOTAL fund (formerly called SAMSUNG fund).

There were 324 registered participants from 32 countries from all parts of the world who delivered 147 oral presentations in two parallel sessions, as well as 64 posters. In total, there were eight individual conference sessions – the supported students had free access also to the conference sessions:

- Nanomaterials and Smart Materials
- Green Polymers, Green Engineering, and Recycling
- Characterization Methods and Structure-Properties Relations
- Biomaterials, Drug Delivery, and Tissue Engineering
- Fibres, Interfaces, Composite Materials
- Mechanical Properties and Performance
- Rheology, Solutions, and Processing
- Multitopic Session

The **Short Course**, a tutorial on polymer characterization held by distinguished experts in their respective fields, preceded the Conference and consisted of eight contributions (50 min + discussion), namely:

- Friction, Scratch Resistance, and Wear (**Witold Brostow**, University of North Texas, Denton, TX, USA)
- Basic Scattering Techniques; Neutrons, X-Rays, and Light (**Jean-Michel Guenet**, Institute Charles Sadron and University of Strasbourg, France)
- Viscoelastic Characterization of Polymers with Atomic Force Microscopy (**Joseph A. Turner**, University of Nebraska, Lincoln, NE, USA)
- Diffractometry, Including X-Rays and Light Scattering (**Masaru Matsuo**, Dalian University of Technology, Dalian, China)
- Structure and Properties of Semi-Crystalline Polymers (**Alejandro Müller**, University of The Basque Country, San Sebastian, Spain)
- Polymer Interfaces—Investigation, Physics, and Application Relevance (**Dirk W. Schubert**, University Erlangen, Nuremberg, Germany)
- Electron Microscopy of Polymers: Morphology and Micromechanics (**Sven Henning**, Fraunhofer, Institute for Microstructure of Materials and Systems, Halle, Germany)
- Polymer Liquid Chromatography (**Dusan Berek**, Slovak Academy of Sciences, Bratislava, Slovakia)
- Thermal and Thermomechanical Properties of Polymers (**Michael Hess**, Department of Physics, University of North Texas, Denton, USA)

The lecturers were available to all participants for further discussion throughout the Conference. There were 85 participants who were mostly, but not exclusively, students.

The prestigious **Paul J. Flory Research Prize 2016** went to Bernhard Blümich, University RWTH Aachen, Germany.

The **International Materials Research Prize** was given to Serigu Okamoto, University of Nagoya, Nagoya, Japan.

The **IUPAC Poster Prizes** (Young Scientists) were given to:

Liubov Matkovska (Natl. Acad. Sci. of Ukraine, Kyiv, Ukraine), Ion-conductive electrolyte based on epoxy oligomer doped with Li-perchlorate salt.

Eduardo P. Milan (Universidade de São Paulo, São Carlos, Brazil), Rheologic effects of mangosteens extract on chitosan/collagen mixtures

Sanja Šešlija (University of Belgrade, Serbia), Novel approach in improvement of native pectin properties: modification using chlorides of renewable carboxylic acids

The **Bruce Hartmann Prize for Young Scientists** went to: Katarzyna Bandzierz (Lodz University of Technology, Lodz, Poland)

The **Jürgen Springer Prize for Young Scientists** went to: Pimchaya Luangaramvej (Chulalongkorn University, Bangkok, Thailand)

Three **Carl Klason Student Awards** went to:

Koudai Suzuki, Nagoya Institute of Technology, Nagoya, Japan

Dirk Dippold, Institute of Polymer Materials, Department of Materials Science and Engineering, University Erlangen-Nuremberg, Erlangen, Germany

Marta Kijanka, Michalina Graczyk, Poznan University, Poznan, Poland

Finally, there were a number of Diplomas of Distinction for students.

A limited amount of money was granted by IUPAC from the HANWHA TOTAL Fund for the support of graduate students and young scientists from underprivileged areas. This support is an important contribution that makes it possible for those students to participate in the Short Course and the Conference. This year, support<sup>4</sup> was granted:

Neil Basson, University of Stellenbosch, Stellenbosch, **South Africa**

Liubov Matkovska, Inst. Macromol. Chem. Natl. Acad. Sci. of Ukraine, Kyiv, **Ukraine**

Eduardo P. Milan, Universidade de São Paulo, São Carlos, **Brazil**

Alina Vashchuk, Institute of Macromolecular Chemistry, Natl. Acad. Sci. Ukraine, Kyiv, **Ukraine**

Sanja Šešlija, Inst. of Chemistry, Technology and Metallurgy, University of Belgrade, Belgrade, **Serbia**

Aleksandra Nešić, Vinča Institute for Nuclear Sciences, University of Belgrade, Belgrade, **Serbia**

## 9. Conferences (Igor Lacík)

In service to PD IUPAC in reviewing the “Applications for IUPAC Sponsorships” (AIS) since December 2013 (taking this role from Prof. Kubisa). Communication with the organizers via Enid Weatherwax and Fabienne Meyers.

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<sup>4</sup> Support for travel and accommodation, amount depending on the distance from Poland

Discussion and final approval by the PD President and Vice President. The conditions of Application for IUPAC (Conference Sponsorship – now correctly termed ‘endorsement’) have slightly changed. Actual information at [ConferenceApplications@iupac.org](mailto:ConferenceApplications@iupac.org) and Application for Endorsement\_2016

#### Conditions

- Organizers of a conference, who wish to apply to IUPAC for endorsement, should supply the information requested in this questionnaire, preferably **one year in advance** (*that is not always the case*).
- 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 attract a more international audience.

#### Criteria

- scientific quality (no problems)
- significance of conference (no problems)
- suitability of conference (no problems)
- evidence of sufficient advanced planning (sometimes problems)
- suitable time spacing of conferences of a similar type (no problems)
- rotation of leadership for conferences in a series or of a similar type (no problems)
- geographically diverse International Advisory Board (sometimes problems)
- gender equity in the composition of committees, presenters and as members of the International Advisory Board (sometimes problems)
- participation of industrial chemists as speakers and as members of the International Advisory Board (sometimes problems)

#### Routinely endorsed Conferences/Tutorials/Seminars

- International Symposium on Ionic Polymerization
- International Symposium on Macromolecular-Metal Complexes (MMC)
- International Conference on Polymer Characterization (PolyChar)
- 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)

#### 2016 endorsed

1. POLYSOLVAT-11 - Polymer-solvent Complexes and Intercalates, January 27 - 30, 2016, KOLKATA, INDIA (Chairman: Prof. Arun Kumar Nandi)
2. Chemistry Conference for Young Scientists, ChemCYS 2016, March 16-18, 2016, Blankenberge, Belgium (Chairman: Prof. Thomas Vranken)
3. POLYCHAR 24 - World Forum on Advanced Materials and 24th Annual Tutorial on Polymer Characterization, May 10 – 14, 2016, Poznan, Poland (Chairman: Prof. Tomasz Sterzynski) Detailed report in Chem Int 38(6)(2016) 28 DOI: <https://doi.org/10.1515/ci-2016-0629>  
For POLYCHAR 23 there is a volume of Macro.Symp., **L. Tan, M. Neghaban (eds) Macromol Symp. 365 (2016)**
4. Polymers and Organic Chemistry 2016 (POC 2016), June 13 - 16 2016, Creta Maris Beach Resort, Hersonissos (near Heraklion), Crete, Greece (Chairman: Prof. Kostas Demadis)
5. 80th Prague Macromolecular Meeting, Self-assembly in the World of Polymers, July 10 – 14 2016, Prague, Czech Republic (Chairman: Dr. Petr Štěpánek)
6. MACRO 2016 - 46th IUPAC World Polymer Congress, July 17 - 21 2016, Istanbul, Turkey (Chairman: Prof. Yusuf Yagci)
7. The 15th International Conference on Molecule-Based Magnets (ICMM2016), September 4 - 8 2016, Sendai, Japan (Chairman: Prof. Masahiro Yamashita)
8. IUPAC-PSK40 Conference on Advanced Polymeric Materials(IPC): Commemorating the 40th Anniversary of The Polymer Society of Korea, October 5 - 7 2016, Jeju, South Korea (Chairman: Prof. Chulhee Kim)

9. 36th Australasian Polymer Symposium, November 20 – 23 2016, Lorne, Victoria, Australia (chairman: Prof Greg Qiao)

#### **2017 endorsed**

1. 14th Annual UNESCO/IUPAC Workshop and Conference on Macromolecules & Materials, April 10 - 13, 2017, Stellenbosch, South Africa (Chairman: Prof B Klumperman), pending
2. APME 2017 - 12th International Conference on Advanced Polymers via Macromolecular Engineering, May 21 -25, 2017, Ghent, Belgium (Chairman: Prof. Filip Du Prez), pending
3. European Polymer Congress 2017, July 2 - 7, 2017, Lyon, France (Chairman: Prof. Jean-Francois Gerard), pending
4. 9th International Symposium Molecular Mobility and Order in Polymer Systems, June 19 - 23, 2017, Saint Petersburg, Russia (Chairman: DrS.A.A.Darinskii), pending
5. Macro- and supramolecular architectures and materials (MAM-17): Multifunctional materials and structures, June 6 - 10, 2017, Sochi, Russia (Chairman: Prof. Eduard Karakhanov), pending
6. International Conference on Novel Materials and their Synthesis, October 14 - 19, 2017, Changsha, China (Chairman: Prof. Yuping Wu), pending
7. POLYCHAR 25 - World Forum on Advanced Materials and 25th Annual Tutorial on Polymer Characterization, October 09 – 14, 2017, Kuala Lumpur, Malaysia (Chin Han Chan)

**Sunday, 17.07.2016**

#### **10. 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. Information about ‘who/what/when’ of the Division should be placed there. The old IUPAC website, however, is still accessible – [www.old.iupac.org](http://www.old.iupac.org). He asked the Division to check the entries. All changes or new entries/information for the website should be forwarded to Claudio. 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.

#### **11. President’s Statement (Greg Russell)**

##### **11.1 General Remarks**

Greg Russell stressed that the President depends on the Division members and acknowledges their efforts and the selfless dedication to the tasks without which IUPAC would not be able to do its job. He asks for any comment or advice that might be useful and encourages initiatives and discussions. He quoted from his last report to the Bureau:

*“IUPAC has to stand for quality, rigor and consensus. If one has good people, then all this will follow. By good people I not only mean intelligent, knowledgeable, personable and passionate people, but perhaps even more importantly I mean selfless people who are given to serving others rather than seeking self-gain, be it financial or reputational. IUPAC strategy must be underpinned by an understanding of this, in which context it is also important to remember without fail that IUPAC work is ‘for love not money’.”*

The output of the Division is very well recognized by the scientific community, e.g. the value of the SPT documents in patent affairs, SPCP is almost entirely funded by industry from all-over the world because of the value it obtains from its work, SKM has provided benchmark rate coefficient for numerous polymerization processes, and its success is reflected by the number of citations, SPED, finally, is recognized for its efforts in supporting and spreading free teaching material and supporting tutorials and short courses.

Driven by an initiative of Chris Ober, Chin Han (Melissa) Chan, and Chris Fellows, SPED runs its own ‘Education Workshop in Polymer Science’ for the first time during MACRO 2016 (Istanbul). Greg Russell raises the question of funding in face of decreasing budgets because there is also the long established Short Course Polymer Characterization that comes with the annual IUPAC endorsed POLYCHAR Conference, see also in Top 8. These two events appear to overlap. Greg Russell suggests that in case of low budget it should be considered to only support financially one in the odd years (POLYCHAR Short Course) and the other one in the even years during MACRO. Michael Hess put in that the POLYCHAR Short Course is well established for decades and it was the first to offer such a tutorial. Although it is welcome to be taken as an example, it now seems that exactly this is taken against it. He stressed the fact that the granted financial support is exclusively used to help students/young scientists from under-privileged areas, and that MACRO has a much higher budget and more sponsors than POLYCHAR. The IUPAC support can only cover a fraction of the students/young scientists’ expenses. All fees for the supported students/young scientists are waived by POLYCHAR. The financial transaction of the allocated money is completely executed by the secretariat in

direct contact with the receiving persons after presentation of the bills. Support of students/young scientists from underprivileged areas should be one of the fields IUPAC should support. The offer of an IUPAC grant frequently enables them to raise additional travel funds in the home countries. **No further decision was made** during the Istanbul meeting.

### 11.2 Div. IV Extra-Divisional Appointments 2017

- **Bureau:** Chris Ober (elected), Greg Russell (Division President)
- IUPAC Standing Committees:
  - Chemical Research Applied to World Needs (**CHEMRAWN**, chair Carlos Tollinche): Ram Adhikari (NR), Mario Malinconico (NR)
  - Committee on Chemistry and Industry (**COCI**, chair Bernard West): Robin Hutchinson (Division representative)
  - Committee on Publications and Cheminformatics Data Standards (**CPCDS**, chair Bonnie Lawlor): Cláudio dos Santos (Division representative)
  - Committee on Chemistry Education (**CCE**, chair Mustafa Sözbilir): Chris Fellows (AM), Ram Adhikari (NR), Supawan Tantayon (Division member)
  - Interdivisional Committee on Terminology, Nomenclature and Symbols (**ICTNS**, chair Ron Weir): Graeme Moad (Division representative)
  - Project Committee (**PC**, chair Doug Templeton): Chris Ober (member)
  - Evaluation Committee (**EvC**, chair Richard Hartshorn): not represented
- Other:
  - **Div. VIII** (Chemical Nomenclature and Structure Representation): Karl-Heinz Hellwich (TM-Pres), Phil Hodge (TM), Jiří Vohlídal (TM)
  - *Pure and Applied Chemistry* Editorial Advisory Board (**PAC-EAB**): Jung-Il Jin (TM), Roger Hiorns (Division representative)
  - **CCRF** (Committee on Chemical Research Funding): Chris Ober (member as Bureau rep, but will also represent the PD)
  - **IUPAC Solvay Award Committee:** Greg Russell (member)
  - Interdivisional Subcommittee on Materials Chemistry (**ISMC**): Chris Ober (chair until GA 2017), Natalie Stingelin (member)
  - **(Sub)committee on Green Chemistry** (became inter-divisional in April 2016 at Montreal, used to reside in Div. III [Organic]): Christine Luscombe (member); Supawan suggested to join too
  - **International Scientific Committee** for the UNESCO-PhosAgro-IUPAC Programme (related to Green Chemistry): Sabine Beuermann (Division representative)

### 11.3 Finances/Budget

#### Actual budget MARCH 2017 see appendix 3

- Total IUPAC budget is about US\$1.2m pa
- Comes almost entirely from three sources:
  - NAO subscriptions: ≈ \$950k pa
  - Investment portfolio: ≈ \$100k pa (returns poor at present!)
  - Publications: ≈ \$100k pa (used to be \$600k pa, largely through *PAC*)

About half this budget on administration (secretariat salaries) and is well-spent (basically to organize a huge volume of voluntary work)

#### IUPAC Project Committee

- Chair: Doug Templeton (Canada); Chris Ober is a member
- Distributes money in two ways:
  - Projects with large budget (generally 1:1 funding with applying Division(s)/Committee(s). Refereeing reports must be very strong. Budget: \$70k per biennium; funded 13 projects (out of 13 applied) in 2014/15 at ≈\$5k each
  - Financial Support of Conferences (FSC) – for conferences in a “scientifically emerging region” (SER), or at a pinch for people in developing countries to attend conferences in first-world countries. Budget: \$35k per biennium; average of \$4.3k per conference
- Not a bottomless pit but we can use, e.g. some SPT projects

- Igor Lacik suggested concerning FSC: “It perhaps would be OK to promote this possibility within the Polymer Division to have this award more competitive (in case there would be more applications).” Michael Hess observed that POLYCHAR usually tried to get financial support from this source for the Short Course either when the conference venue was in a developing country or in particular for students from underprivileged areas. In particular the latter case should be covered from FSC because it addresses directly participants who badly need such support.

### Polymer Division Finances

- Sources:
  - Grant from the center (about US\$50k per 2 years)
  - *Mac. Symp.* royalties (US\$1k per issue), so Igor Lacik should encourage endorsement applicants to have a *MS* issue from their conference. 2015 take was US\$7k (ie., 7 issues).<sup>5</sup>
  - Inter-divisional and – committee projects, i.e., they pay part of the budget too
  - Hanwha Total (formerly Samsung) fund<sup>6</sup> granted 2003 by SAMSUNG for support of Young Scientists (i.e. not older than 40 years) in the following areas<sup>7</sup>:
    - Samsung–IUPAC Young Polymer Scientist Award
    - Travel Grant for Students from Economically Disadvantaged Countries to the World Polymer Congresses
    - Support of Education-Related Projects<sup>8</sup>

### Young Observers

- Young Observers (YO) are paid for by their NAO, not by IUPAC. NRs should be encouraged to seek travel funding from their NAO.
- These are munificent, e.g. Paul Topham could receive up to £2,500 from the RSC for Busan
- YOs apply to and are funded by their NAO, not to and by IUPAC
- The Polymer Division can support potential YOs by identifying young (under-45) people we want in the PD, and get them to apply.
- YOs are funded to attend GAs, not MACROs, i.e., *invite people for odd years not for even years*.
- Fabienne administers the program; Roger Hiorns has been involved and is likely to run it from 01/2016

### 11.4 Elections

#### 2015 process for 2016-7 positions:

#### Nominating Committee

- Greg Russell (DVP ⇒ chair)
- Kris Matyjaszewski (USA)
- Jung-Il Jin (ROK)
- Chris Ober (USA)

**Christine Luscombe**, the new DVP, will replace Greg Russell in running the 2017 process for 2018-9 positions.

#### The Polymer Division Officers 2016-9 are:

- Greg Russell (Division President)
- Christine Luscombe (Division Vice-President)

<sup>5</sup> e.g.: For POLYCHAR 2016: L. Tan, M. Neghaban (eds) *Macromol Symp.* 365 (2016)

<sup>6</sup> The fund stems from the Samsung Funds IUPAC Programs for Young Polymer Scientists, granted by Samsung in 2003 (USD 125,000 and another USD 25,000 in the year 2006) to the Polymer Division (since 2014 Hanwha-Total- IUPAC...)

<sup>7</sup> *Chemistry International--Newsmagazine for IUPAC*. Volume 27, Issue 4, Pages 14–15, ISSN (Online) 1365-2192, ISSN (Print) 0193-6484, DOI:10.1515/ci.2005.27.4.14b, September 2009

<sup>8</sup> The Prague UNESCO/IUPAC Postgraduate Course in Polymer Science and POLYCHAR were usually supported from this fund.

- Michael Walter (Division Secretary)

#### **Polymer Division Members (TMs and AMs) 2016 (01.01.)-2017 (31.12.):**

##### **Candidate Considerations**

- IUPAC's eligibility criteria
- Spread of expertise across subcommittees
- Retention of expertise
- New blood
- Gender balance
- Future officers
- Geographic spread
- Specific situations, e.g. SPED leadership
- **Upcoming meeting schedule** (it's good to have a local in the PD!)

##### **Titular Members (7)**

- Jiasong He (SPCP)
- Sabine Beuermann (SKM)
- Mitsuo Sawamoto (strategy)
- Natalie Stingelin (SPT, SPED)
- Igor Lacik (conferences)
- Yusuf Yagci (trends, MACRO)
- Michael Buback (Division Past President)

##### **Associate Members (6)**

- Dietmar Auhl (SPCP)
- Robin Hutchinson (SMK)
- Rigoberto Advincula (SPED)
- Roger Hiorns (SPT)
- Graeme Moad (SPT, SMK)
- Michael Hess (SPT, SPED, assistant secretary, awards)

##### **National Representatives (10)**

- Voravee Hoven (Thailand)
- Chin-Han Chan (Malaysia)
- Mario Malinconico (Italy)
- Cláudio dos Santos (Brazil)
- Chain-Shu Hsu (China/Taipei)
- Richard Jones (UK)
- Doo Sung Lee (South Korea)
- Olga Philippova (Russia)
- Ram Adhikari (Nepal)
- Jiří Vohlídal (Czech Republic)

#### **11.5 Electorate for Division Elections**

- **Current situation** (standardized across all divisions):
  - Current: **(i)** TMs, AMs, NRs, **(ii)** SC chairs, **(iii)** TGLs and **(iv)** NC members **are all eligible to vote**
  - Also “the members ... of such other bodies within the Division that the Bureau may specify” (By-Law B3.104 ). Otherwise expressed: **“Members of any sub-committees and/or commissions that the Division Committee wishes to include (as indicated in advance of the elections).”**
- **For 2015 elections:** all Divisions had only (i)-(iv) above as voters.
- **Prior to 2015:** the PD additionally had all SC and TG members as eligible voters.

Whom else would we like to be enfranchised? Greg Russell is empowered to request any further enfranchise of the Secretary General, see above. Secretary General wants our feedback on what we think should be standard practice across all Divisions.

What Div. VIII has requested wants to continue their practice in having

- Division Committee members
- Subcommittee chairs
- Task group leaders
- Members of the Advisory Subcommittee

Further comments are:

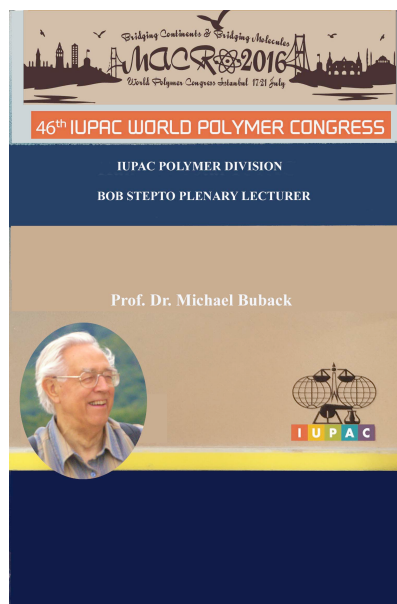
- It was not known yet that the nominating Committee was included, but that is fine and meaningful.
- Concerning Task group leaders it is important to include also those who manage a nomenclature project which has formally been assigned to another Division (e.g. 2008-015-1-400, 2015-003-2-300).
- It meaningful to include the IUPAC-funded members of JCBN (Joint Commission on Biochemical Nomenclature).”

### 11.6 Awards

There are five awards/prizes associated with the Polymer Division:

- Hanwha Total-IUPAC Young Polymer Scientist Award<sup>9</sup>
- DSM Award (organized by DSM)
- *Polymer International Prize* (organized by *PI*)
- IUPAC Student Poster Prize(s) at Macro meetings (organized by Macro committee)
- Bob Stepto Lecturer

The Hanwha and Stepto are really only organized within the PD, in collaboration with Macro committee. Michael Hess organized the Hanwha and has been overseeing the rest, acting as an awards coordinator of sorts. The Division President organized the Stepto Lecture.



Design of the first **Bob Stepto Plenary Lecture Plaque**, granted to Michael Buback in 2016, the first lecturer. The figure shows the printing on a heavy glass stand and measures about 16 cm x 12 cm. In the future the design has to be modified accordingly and the organizer of the future MACROs have to be informed so that they can provide the corresponding plaque.

Yusuf Jagci, as the organizer of 46<sup>th</sup> IUPAC MACRO, funded the invited plenary speakers. This is not a general rule but of particular importance for the **IUPAC Bob Stepto Plenary Lecture** and **the IUPAC Hanwha-Total Award**. Roger Hiorns raised the question if the awardees of a prize should be treated as a ‘normal’ plenary speaker. Chris Ober suggested that this question should be forwarded to the organizing committees of future IUPAC MACROs and to negotiate with the Division President whether or not a financial contribution of the Polymer Division is possible. In 2016 the Bob Stepto plaque and the two IUPAC Hanwha-Total plaques were produced under the supervision and paid by the Polymer Division. Greg Russell observed that the Division’s budget is very limited. The Division granted the mandate to

<sup>9</sup> Samsung Total Petrochemicals has changed its name to Hanwha Total Petrochemicals, therefore the name of the biennial **Samsung Young Polymer Scientist Award** granted at MACRO – IUPAC World Polymer Congress is changed to **Hanwha Total-IUPAC Young Polymer Scientist Award**.

continue with the prizes.

- **The Bob Stepto Lecture:** There was an Award ceremony for Michael Buback in Istanbul during MACRO 2016. The plaque was prepared later and later handed out to Michael Buback by Michael Hess.
- **Hanwha-Total<sup>10</sup>:**
  - **Moon Jeong Park** (Pohang University of Science and Technology), Award ceremony was held during the meeting of the Korean Polymer Society in fall 2016, and the plaque was handed out to Prof. Park by Prof. Jung-II Jin as IUPAC representative.
  - **Brent Sumerlin** (University of Florida), the Award celebration will be held during MACRO 2018, Cairns, the plaque was prepared and will be brought to Cairns.
- **DSM<sup>11</sup>: Steve Armes** (Uni. of Sheffield), Award celebration during MACRO 2018, Cairns, organized by DSM.
- **Polymer International<sup>12</sup>: Richard Hoogenbloom** (Ghent University), Award celebration during MACRO 2018, Cairns.

#### Award Criteria

- Hanwha<sup>13</sup>: for “most promising young polymer scientist from any country under the age of 40.”
- DSM<sup>14</sup>: seems to change slightly each time (whether or not this is a good idea is questionable):
  - 2014: bestowed “in recognition of outstanding scientific work by an established scientist that has significantly contributed to the advancement of the materials sciences field.”
  - 2016: “established to recognize and reward excellence in innovative research in materials sciences.”

The following questions arose:

- *Polymer International*: for “creativity in applied polymer science or polymer technology”; under age 40
- Age barriers too similar?
- Areas too general/similar?

In particular, the nomination process for Hanwha-Total IUPAC Award it is not yet finally determined. The situation is as follows (Michael Hess):

After problems with nominations in the year 2012, MH conducted the Hanwha-Total IUPAC 2014 Award procedure together with the local organizers in Chiang Mai. The nominations came mainly from the Session Chairs of MACRO 2014.

The request for nominations was copied from the procedure of Polymer International. As in 2014 and 2016, MH will also contact DSM and Polymer International to make sure that there will not be an overlap of candidates. Because of changing contact persons it is sometimes difficult to find the actual contact at DSM.

For MACRO 2016, MH asked the MACRO Chairs for proposals (this time not a single response) and asked Division Members and some prominent scientists for nominations. 5 nominations were received and the newly formed **Award Committee** consisting of Greg **Russell** (DP), Christine **Luscombe** (DVP), Roger **Hiorns** (SPT), Yusuf **Yagci** (as MACRO Chair), **Jung-II Jin** (elder Division Member), **MH** (Division Secretary), determined the Awardees (two in 2016) on the basis of the information (no ranking): *scientific CV/age/gender/geographical origin/number of publications/citations/h-index*<sup>15</sup>. The enormous differences in the *criteria mentioned above* still makes the selection process difficult and further improvements should be considered.

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<sup>10</sup> Previous award winners: Timothy **Deming** (2004), Pavel **Kratochvil** – Samsung Education Prize (2005), Greg **Tew** (2006), Eric **Cloutet** (2008), Christopher **Bielawski** (2010), Rachel **O'Reilly** (2012), Sebastien **Perrier** (2014)

<sup>11</sup> Previous award winners: Craig **Hawker** (2008), Han **Meijer** (2010), Geoff **Coates** (2012), Jiang Ping **Gong** (2014)

<sup>12</sup> Previous award winners: Zhenan **Bao** (2008), Molly **Stevens** (2010), Ali **Khademhousseini** (2012); William **Dichtel** (2014)

<sup>13</sup> Hanwha-Total was the first of these Awards, named Samsung in the beginning

<sup>14</sup> The Award is strongly influenced by DSM

<sup>15</sup> Wikipedia: The **h-index** is an author-level metric that attempts to measure both the productivity and citation impact of the publications of a scientist or scholar. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications.

Discrimination in particular of the Polymer International Award (since 2008 and is also controlled by the publisher) and the Hanwha-Total Award (since 2004 and is completely IUPAC controlled) should be considered because there are significant overlaps.

### 11.7 Other Issues

Greg Russell addressed that the Polymer Division will be 50 years in 2017 and asked for some public activities on this behalf. Otto Wichterle was the Division's first President, then.

There is an initiative from Bruce Eichinger, Akihiro Abe and others for a 'UNESCO Year of Polymers/Macromolecules in the year 2020'<sup>16</sup> to remind on the start of Polymer Science 100 years ago with the landmark publication of H. Staudinger defining the basic principles of this new field of chemistry.<sup>17</sup> Greg Russell announced that he will put some effort in finding support of the idea in IUPAC and the scientific community.

### The Polymer Division in a Changing Chemical World

- The top-tier nations in IUPAC are (in alphabetical order): China, Germany, Japan, (South) Korea, USA
- France, Russia and UK are no longer in this bracket. China (Taipei) then India are the nations most likely to join it next.
- Are we in the PD, and indeed the whole of IUPAC, prepared for this re-alignment in global chemistry? What can we do to better reflect, acknowledge and work with it?
- The 2018-9 President of IUPAC is Qi-Feng Zhou of China. He is probably a polymer chemist and studied for some time at the University of Massachusetts, Amherst.

### 12. Future IUPAC World (Polymer) Congresses (Greg Russell)

- WPC/Macro2018: Cairns, Australia
- IUPAC WCC & GA 2019: To be held in Paris, France to celebrate the centenary of the founding there of IUPAC
- WPC/Macro2020: Jeju Island, South Korea (ppt presented by Greg Russell)
- IUPAC WCC & GA 2021: Beijing, China (likely?)
- WPC/Macro2022: Winnipeg or Mexico? There is an application from Winnipeg, Canada with a ppt-presentation presented by Greg Russell. Although, the applicants from Canada are not known to members of the Division, the venue seems to be appropriate and should be considered after further information are available.
- In recognition of this centenary, there should be special IUPAC activities both at the conference and throughout the year, including in the Polymer Division. No objections so far and no further information about an application from Mexico. Graeme Moad pointed out that some companies/organization might not allow travels to certain countries.

### 47<sup>th</sup> MACRO 2018 Cairns (01.-06.07.2018)

For the up-to-date program and the speakers see <http://www.macro18.org/>

Martina Stenzel and Sebastien Perrier were unable to join the Istanbul Meeting; an up-date was given by Chris Fellows.

Paula Leishman has been appointed as professional Conference organizer:

Paula Leishman has been running the Australian Polymer Symposium for many years and has been the PCO at PPC in 2009 (around 1000 delegates)

<http://www.leishman-associates.com.au/>

Finances:

- A budget has been approved by the Royal Australian Chemical Institute (RACI) who will underwrite the congress
- Finances are administered by Leishman

<sup>16</sup> Like 2015 – the UNESCO International Year of Light

<sup>17</sup> H. Staudinger, Ber. Deut. Chem. Ges. 53(6) (1920)1073-1085

- Estimated registration fee: around 1000 A\$ (includes lunch and tea breaks)
- Sponsorship will be raised in 2017 and 2018

Plenary Speakers:

Ian Manners (Bristol), Zhenan Bao (Stanford), Ben Zhong Tang (Hong Kong University of Science and Technology)

1. Recent Developments in Polymer Design
2. Polymers & Nanotechnology
3. Polymers in Biotechnology, Medicine & Health
4. Energy, Optics, & Optoelectronics
5. Smart and Functional Polymers
6. Renewable Resources and Biopolymers
7. Polymer Engineering and Modelling
8. Polymer Characterization
9. Polymer Education
10. Innovation and industry

### 13. Date of Next Meeting (Hess)

General Assembly Year

SPT 10 – 13th July 2017

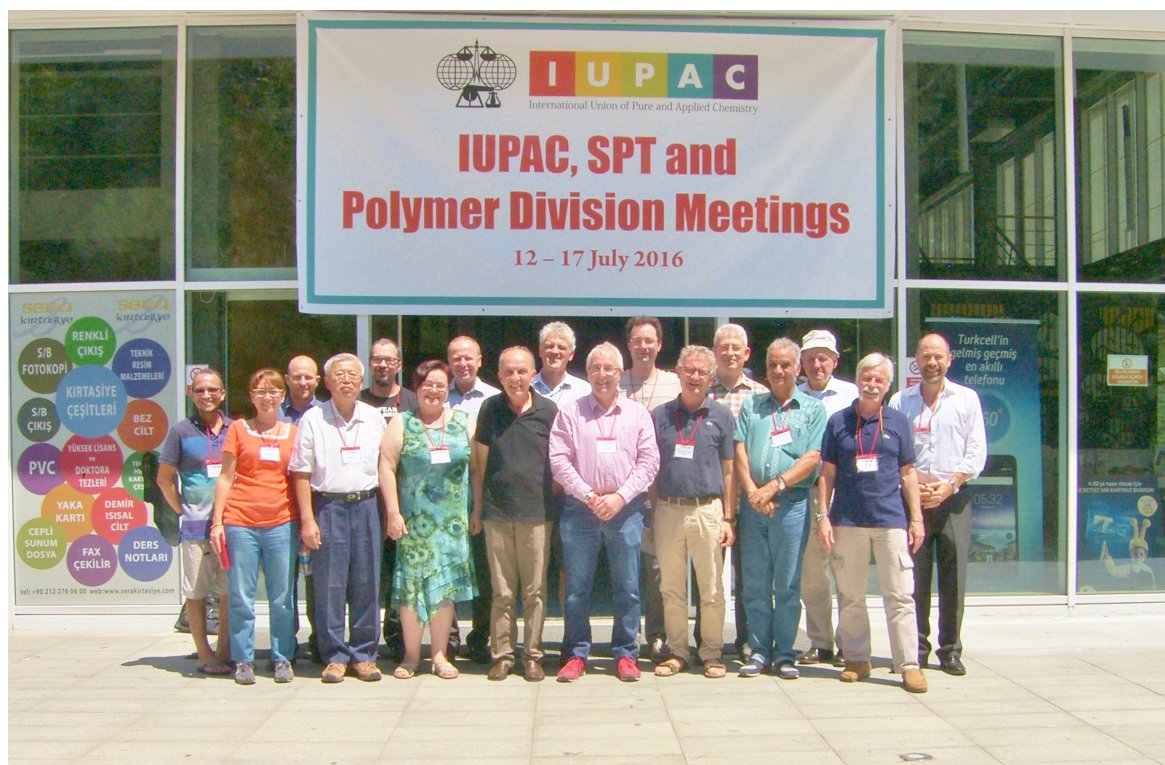
Polymer Division 8 – 9th July 2017

World Congress (Conference) 9 – 14th July 2017

### 14. Closing remarks

Gregg Russell closed the 2016 meeting of the Polymer Division and thanked all participants for their fruitful cooperation since the Busan meeting and in particular Yusuf Yagci and his team for the wonderful job they did under the extremely difficult circumstances caused by the failed military coup and terroristic threats. He wished everyone safe travel back home looking forward to seeing all again at IUPAC General Assembly 2017 in Sao Paulo.

Michael Hess (Acting Secretary), June 2017



## APPENDIX 1

**AGENDA**  
**Polymer Division Meeting in ISTANBUL, Turkey**  
**JULY 16 - 17, 2016**  
(AFTER THE SPT MEETING, JULY 12 – 15, 2016)  
**ITÜ University Maslak Campus**

**Saturday , July 16 , 2016, 09:00 - 17:30**

- 1 . President's Introductory Remarks and Modification of the Agenda (Russell)
- 2 . Apologies for Absence
- 3 . Approval of the Minutes of the Division Meeting, Busan, South Korea, August 2015 (Hess)
- 4 . Report on Interdivisional Subcommittee on Materials Chemistry – ISMC (Stingelin)
- 5 . Report on Terminology and Nomenclature Projects – SPT (Hiorns)
- 6 . Report on Structure - Properties Projects – SSP (He)
- 7 . Report on Polymerization Kinetics & Mechanics – SKM (Beuermann)
- 8 . Report on Educational Projects and Activities – SPED (Fellows and Theato)  
    Report on UNESCO/IUPAC Postgraduate Course in Polymer Science (Sturcova)  
    Report on POLYCHAR Tutorial and Conference (Hess)

**DIVISION PHOTO – just prior to Sat. lunch break**

**DIVISION DINNER – Sat. Evening (see Information from Paul Topham)**

**Sunday , July 17, 2016 , 09:00 – 13:00**

- 9 . Report on Division- Endorsed Conferences and Financial Support of Conferences (Lacik)
- 10 . Electronic Communication (dos Santos )
- 11 . President's Remarks including Division elections, Finances, and Awards (Russell)
- 12 . Future MACRO Conferences (, Perrier & Stenzel – Cairns (Australia) 2018, Choi – Jeju Island (Korea) 2020, Jackman – Winnipeg 2022)
- 13 . Next Meeting (Topham, Hiorns, Russell): 49th IUPAC General Assembly, São Paulo, Brazil, 6–13 July 2017 (<http://www.iupac2017.org>)  
PD – Sat. 8 and Sun. 9 July; SPT – Mon. 10 to Thu. 13 July.
14. Closing Remarks

## APPENDIX 2

### Subcommittee on Modelling of Polymerization Kinetics and Processes

Publications and citations to June 22<sup>nd</sup> 2015 (first number) and to July 22<sup>nd</sup> 2016 (second)

M. Buback e.a J. Polym. Sci., Polymer Letters Ed. 26, 293-297 (1988). “Consistent values of rate parameters in free radical polymerization systems”

**161 → 162** citations

M. Buback, e.a., J. Polym. Sci., Polym. Chem. Ed. 30, 851-863 (1992). “Consistent values of rate parameters in free radical polymerization systems. Part II: Outstanding dilemmas and recommendations”

**201 → 209** citations

R. G. Gilbert, *Pure App. Chem.* 64, 1563-1567 (1992). “Consistent values of rate parameters in free-radical polymerization systems”

**37 → 37** citations

M. Buback, e.a. *Macromol. Chem. Phys.* 196, 3267-3280 (1995).

“Critically evaluated rate coefficients for free-radical polymerization, 1. Propagation rate coefficients for styrene”

**526 → 540** citations

S. Beuermann, e.a. *Macromol. Chem. Phys.* 198, 1545-1560 (1997).

“Critically evaluated rate coefficients for free-radical polymerization, 2. Propagation rate coefficients for methyl methacrylate”

**400 → 415** citations

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

“Critically-evaluated propagation rate coefficients in free radical polymerizations. Styrene and methyl methacrylate”

**108 → 112** citations

S. Beuermann, e.a., *Macromol. Chem. Phys.* 201, 1355-1364 (2000).

“Critically evaluated rate coefficients for free-radical polymerization - 3. Propagation rate coefficients for alkyl methacrylates”

**175 → 184** citations

S. Beuermann, e.a., *Macromol. Chem. Phys.* 204, 1338-1350 (2003).

“Critically evaluated rate coefficients for free-radical polymerization, 4. Propagation rate coefficients for methacrylates with cyclic ester groups”

**66 → 72** citations

J. M. Asua, e.a. *Macromol. Chem. Phys.* 205, 2151-2160 (2004).

“Critically evaluated rate coefficients for free-radical polymerization, 5. Propagation rate coefficient for butyl acrylate”

**213 → 234** citations

S. Beuermann, e.a., *Pure Appl. Chem.* 79, 1463-1469 (2007).

“Critically evaluated rate coefficients for free-radical polymerization, Part 6. Propagation rate coefficient of methacrylic acid in aqueous solution”

**35 → 40** citations

N. Kubota, e.a., *Macromol. Chem. Phys.* 208, 1403-1411 (2007).

“Determination of the Propagation Rate Coefficient of Vinyl Pivalate based on EPR Quantification of Propagating Radical Concentration”

**3 → 8** citation

C. Barner-Kowollik, e.a. *Polym. Chem.* 4, 204-212 (2014).

“Critically evaluated rate coefficients for free-radical polymerization, 7. Secondary-radical propagation rate coefficient for methyl acrylate in bulk”

**10 → 20** citations

### Critically Evaluated Rate Coefficients in Radical Polymerization: Propagation

A very successful series:

| Monomer                     | Journal               | Year | Web of Science Citations (6/2015-7/2016) |
|-----------------------------|-----------------------|------|------------------------------------------|
| 1. Styrene                  | Macromol. Chem. Phys. | 1995 | 540 $\diamond$ 557                       |
| 2. Methyl Methacrylate      | Macromol. Chem. Phys. | 1997 | 415 $\diamond$ 431                       |
| 3. Alkyl Methacrylates      | Macromol. Chem. Phys. | 2000 | 175 $\diamond$ 184                       |
| 4. Functional Methacrylates | Macromol. Chem. Phys. | 2003 | 66 $\diamond$ 72                         |
| 5. n-Butyl Acrylate         | Macromol. Chem. Phys. | 2004 | 213 $\diamond$ 234                       |
| 6. Methacrylic Acid         | Pure Appl. Chem.      | 2007 | 35 $\diamond$ 42                         |
| 7. Methyl Acrylate          | Polym. Chem.          | 2014 | 10 $\diamond$ 20                         |
| 8. Vinyl acetate            | close to submission   | 2016 |                                          |

M. Buback, e.a., Macromol. Chem. Phys. 203, 2570-2582 (2002).

*“Critically evaluated termination rate coefficients for free-radical polymerization – 1. The current situation”*

**122  $\rightarrow$  128** citations

C. Barner-Kowollik, e.a., Prog. Polym. Sci. 30, 605-643 (2005).

*“Critically evaluated termination rate coefficients for free-radical polymerization - 2. Experimental methods”*

**84  $\rightarrow$  86** citations

C. Barner-Kowollik, e.a. J. Polym. Sci. Polym. Chem. 44, 5809-5831 (2006).

*“Mechanism and Kinetics of Dithiobenzoate-Mediated RAFT Polymerization, 1. The Current Situation”*

**293  $\rightarrow$  309** citations

I. Lacík, e.a. Macromol. Chem. Phys. Macromol. Chem. Phys. 216, 23-37 (2015).

*“SEC Analysis of Poly(Acrylic Acid) and Poly(Methacrylic Acid)”*

**0  $\rightarrow$  6** citations

## Appendix 3

### Budget Status March 2017

| Division IV      | Budget Allocation  | Actuals            | Remaining Balance  | % Remaining Budget |
|------------------|--------------------|--------------------|--------------------|--------------------|
| Projects - 70%   | \$34,790.00        | \$22,500.00        | \$12,290.00        | 33.33%             |
| Operations - 30% | \$14,910.00        | \$7,016.52         | \$7,893.48         | 52.94%             |
| <b>Total</b>     | <b>\$49,700.00</b> | <b>\$29,516.52</b> | <b>\$20,183.48</b> | <b>40.61%</b>      |

| Date                                | Project Number           | Div IV             | Div I             | Div II            | Div III           | Div V           | Div VI            | Div VII           | Proj Comm         | CCE               | WCLM               | Hamwa             | Total              |
|-------------------------------------|--------------------------|--------------------|-------------------|-------------------|-------------------|-----------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|--------------------|
| 25-Feb-2016                         | 2015-007-1-400 Chen      | \$1,500.00         |                   |                   |                   |                 |                   |                   |                   |                   |                    |                   | \$1,500.00         |
| 14-Mar-2016                         | 2016-008-1-400 Russell   |                    |                   |                   |                   |                 |                   |                   |                   |                   |                    | \$5,000.00        | \$5,000.00         |
| 15-Jun-2016                         | 2015-050-3-400 Adhikari  | \$5,000.00         |                   |                   |                   |                 |                   |                   |                   |                   |                    |                   | \$5,000.00         |
| 4-Jan-2017                          | 2016-018-1-400 Stingelin | \$5,000.00         |                   |                   |                   |                 |                   |                   |                   |                   |                    |                   | \$5,000.00         |
| 4-Jan-2017                          | 2015-049-1-400 Topham    | \$3,000.00         |                   |                   |                   |                 |                   |                   |                   |                   |                    |                   | \$3,000.00         |
| 24-Jan-2017                         | 2016-032-2-020 Ober      | \$1,000.00         | \$1,000.00        | \$1,000.00        | \$300.00          | \$300.00        | \$1,000.00        | \$1,000.00        |                   | \$1,000.00        | \$12,000.00        |                   | \$19,000.00        |
| 14-Feb-2017                         | 2017-001-1-020 Forman    | \$1,000.00         |                   |                   | \$300.00          | \$400.00        | \$1,000.00        |                   | \$2,100.00        |                   |                    |                   | \$5,000.00         |
| 23-Feb-2017                         | 2016-028-1-400 Qiao      | \$4,000.00         |                   |                   |                   |                 |                   |                   |                   |                   |                    |                   | \$4,000.00         |
| 10-Mar-2017                         | 2016-033-1-400 Chen      | \$2,000.00         |                   |                   |                   |                 |                   |                   |                   |                   |                    |                   | \$2,000.00         |
| <b>New Project Commitment Total</b> |                          | <b>\$22,500.00</b> | <b>\$1,000.00</b> | <b>\$1,000.00</b> | <b>\$1,000.00</b> | <b>\$900.00</b> | <b>\$2,000.00</b> | <b>\$1,000.00</b> | <b>\$2,100.00</b> | <b>\$1,000.00</b> | <b>\$12,000.00</b> | <b>\$5,000.00</b> | <b>\$49,500.00</b> |

| Project Numbers                  | Total Project Budget | 2017 Starting Balance | 2017 Spent | Remaining Funds | Planned End Date |
|----------------------------------|----------------------|-----------------------|------------|-----------------|------------------|
| 2005-011-3-400 Luruli            | \$5,000.00           | \$2,656.00            | -          | \$2,656.00      | 31-Dec-2012      |
| 2007-004-1-400 Handge            | \$4,000.00           | \$1,574.83            | -          | \$1,574.83      | 31-Dec-2016      |
| 2008-028-1-400 Auhl              | \$5,000.00           | \$5,000.00            | -          | \$5,000.00      | 31-Dec-2017      |
| 2009-019-2-400 Meira             | \$5,000.00           | \$290.00              | -          | \$290.00        | 30-Jun-2015      |
| 2009-050-1-400 Moad              | \$5,300.00           | \$1,259.99            | -          | \$1,259.99      | 31-Dec-2017      |
| 2010-019-1-400 Bucknall          | \$5,000.00           | -                     | -          | -               | 31-Dec-2016      |
| 2010-027-2-400 Bertin            | \$1,000.00           | \$1,000.00            | -          | \$1,000.00      | 31-Dec-2013      |
| 2010-032-3-400 Mormann           | \$9,000.00           | \$3,241.55            | -          | \$3,241.55      | 30-Sep-2017      |
| 2012-001-1-400 Ober_Jones        | \$6,000.00           | -                     | -          | -               | 31-Dec-2017      |
| 2012-027-3-400 Ober              | \$6,000.00           | \$4,418.00            | -          | \$4,418.00      | 1-Mar-2015       |
| 2012-042-1-400 Vert              | \$4,500.00           | \$988.00              | -          | \$988.00        | 31-Aug-2017      |
| 2012-048-3-400 Hiorns & Vohlidal | \$6,800.00           | \$1,642.23            | -          | \$1,642.23      | 1-Jun-2016       |
| 2013-045-1-400 Hutchinson        | \$5,000.00           | \$5,000.00            | -          | \$5,000.00      | 1-Nov-2016       |
| 2013-047-1-400 Beuermann         | \$4,000.00           | \$4,000.00            | -          | \$4,000.00      | 1-Nov-2016       |
| 2013-049-1-400 Hess              | \$2,500.00           | -                     | -          | -               | 31-Dec-2016      |
| 2013-051-1-400 Russell           | \$6,000.00           | \$5,103.00            | -          | \$5,103.00      | 1-Nov-2017       |
| 2014-014-1-400 Meille            | \$4,500.00           | \$3,002.73            | -          | \$3,002.73      | 1-Sep-2017       |
| 2014-033-1-400 Vert              | \$3,000.00           | \$3,000.00            | -          | \$3,000.00      | 1-Aug-2017       |
| 2014-034-2-400 Vert              | \$9,000.00           | \$9,000.00            | -          | \$9,000.00      | 1-Jun-2018       |
| 2015-013-1-400 Luscombe          | \$7,700.00           | \$7,700.00            | -          | \$7,700.00      | 1-Aug-2019       |
| 2015-014-1-400 Walter            | \$5,800.00           | \$5,800.00            | -          | \$5,800.00      | 1-Aug-2019       |
| 2015-023-1-400 Adhikari          | \$6,000.00           | \$6,000.00            | -          | \$6,000.00      | 31-Jun-2019      |
| 2015-032-2-400 Hess              | \$12,720.00          | \$12,670.00           | -          | \$12,670.00     | 31-Dec-2019      |
| 2015-034-1-400 Rajiwara          | \$6,000.00           | \$6,000.00            | -          | \$6,000.00      | 31-Dec-2018      |