

IUPAC POLYMER DIVISION (IV) – Report

Executive Summary and Highlights

By Greg Russell (Division President)

Preamble

This report reflects that the Polymer Division (PD) is one of the biggest and most active units of IUPAC. Here is presented an executive summary, with detail in the 7 appendixes that follow. The motor of the Division comprises its 4 subcommittees, detailed reports from which are included as Appendixes 3–6.

Membership

Appendix 1 gives the rosters of members for both the current and the preceding biennia. The presentation makes clear the changes that have occurred. For the TM and AM positions there is an emphasis on electing/appointing active people and ensuring coverage of all subcommittees and roles. For the NR positions it is also desired to make appointments of people who are active within the Division, but at the same time the need for geographic diversity is taken into account. It is felt that these objectives have been met.

Interdivisional Activities

Appendix 2 lists Polymer Division members participating in interdivisional activities. The breadth of this list indicates the importance that the PD places on contributing to other parts of IUPAC wherever possible. It is hoped that all such appointees contribute actively in these roles. If this is not the case, then the person should be replaced.

Of especial significance is interaction of the PD, through its Subcommittee on Polymer Terminology (SPT), with Div. VIII. This is because “chemical nomenclature and structural representation” are obviously of tremendous importance in polymer chemistry. These interactions are formalized through having two SPT members as TMs of Div. VIII. In addition, the current President of Div. VIII is also an active member of SPT. Not only is there this direct overlap of personnel, but at each of the last two General Assemblies there has been a formal interdivisional meeting between Divs. IV and VIII, as part of the wider IUPAC schedule in this regard. Having attended both these meetings, I would describe them as moderately attended (about 15 people in all, split evenly between both Divisions) and moderately successful.

Polymer Division Meetings

The Polymer Division meets annually. In even years these meetings are held as an adjunct to the IUPAC World Polymer Congress (Macro conference) taking place. In odd years they are held as part of the IUPAC General Assembly of that year. Thus the following meetings occurred over the preceding biennium:

- 4–5 July 2014 in Chiang Mai, Thailand (before Macro2014) with 34 attendees.
- 8–9 August 2015 in Busan, Republic of Korea (48th General Assembly) with 36 attendees.

These meetings last for 1.5 days and cover all division matters. The Secretary records lengthy, detailed minutes – typically 30 pages in length! – that are made freely available on IUPAC’s website. In accord with the above pattern, the next PD meeting will take place as follows:

- 16–17 July 2016 in Istanbul, Turkey (prior to Macro2014).

Conferences

Many conferences take place in the area of polymer science and technology, especially when one takes into account the strong overlap of our discipline with materials chemistry. For this reason we appoint a PD member whose specific job is to review (conference) Applications for IUPAC Sponsorship (AISs). Igor Lacik, currently a TM, has been performing this role since the end of 2013, taking over from Prem Kubisa (whose many years of service are gratefully acknowledged). Igor's report is in Appendix 7. In it he not only lists the polymer-related conferences that have been granted IUPAC endorsement via an AIS (average of about 10 per year), but he also makes suggestions for how the application process could be improved.

Conferences granted IUPAC endorsement by the PD are still encouraged to contribute papers for an issue of Wiley's *Macromolecular Symposia*. Not only is this good branding for IUPAC, but each issue contributes approximately US\$1k to PD funds. Unfortunately this practice is becoming less and less common, which is a general trend in science: workers are reluctant to publish their work in symposium journals, and instead feel compelled to strive for journals with higher impact factor. Nevertheless there is still a trickle of *Macromol. Symp.* issues from IUPAC-endorsed conferences.

By far the most important conferences endorsed by IUPAC through the PD are the World Polymer Congresses (Macro meetings) that are held every two years. The last such conference and the next are as follows:

- Macro2014 / 45th World Polymer Congress: held 6-11 July 2014 in Chiang Mai, Thailand, with over 1 000 delegates and chaired by Supawan Tantayon.
- Macro2016 / 46th World Polymer Congress: to be held 17-21 July 2016 in Istanbul, Turkey, with approx. 2 500 delegates anticipated and chaired by Yusuf Yagci (currently a TM of the PD).

These conferences have a long history (see the number there have been!) and are the flagship events of the PD, being the largest (in terms of attendance) and broadest (in terms of areas covered) polymer conferences worldwide. There is extensive branding of IUPAC – indeed, they are popularly known as IUPAC conferences! – through opening and closing addresses by PD officers, through IUPAC awards (see below), and so on. Accordingly, these conferences are planned in close collaboration with the PD, even though IUPAC has no financial involvement. Locations are chosen 4-6 years in advance, which means one can be subject to misfortune, as has been the situation with both cases above: attendance in 2014 was severely diminished by the political riots in Thailand early in the year (nevertheless the conference still made a slight profit), while in 2016 there have been two terrorist bombings in Istanbul. Such situations should be familiar to the IUPAC Bureau, because riots in Istanbul were a problem for the GA and WCC held there in 2013, while MERS was a problem for the GA and WCC in Busan last year. At this stage it is planned to go ahead with Macro2016, but obviously this is a situation that is being actively monitored.

Awards

For some years now the PD has had three highly prestigious prizes, all awarded in even years at Macro conferences:

- **The *Polymer International*-IUPAC Award for Creativity in Applied Polymer Science or Polymer Technology:** nominees must be under the age of 40 and win US\$5 000 in addition to giving a keynote lecture at the associated Macro conference. For 2016

the judging panel was chaired by Dick Dijkstra, with the winner being Richard Hoogenboom from Ghent University.

- **The Hanwha Total-IUPAC Young Polymer Scientist Award** (note the name change from Samsung to Hanwha due to Samsung Total Petrochemicals becoming Hanwha Total Petrochemicals): this is for the most promising young polymer scientist from any country under the age of 40, with the winner receiving US\$2 000 in addition to giving a keynote lecture at the associated Macro conference. For 2016 the judging panel was chaired by Michael Hess and there will be two winners (although they haven't yet been announced!).
- **The DSM Materials Science Award:** bestowed "in recognition of outstanding scientific work by an established scientist that has significantly contributed to the advancement of the materials sciences field," the winner receives EUR 50 000. The judging is carried out by DSM with PD representation (currently Michael Buback and Chris Ober), a process that is still taking place for 2016.

In addition there will be a new award in 2016:

- **The Stepto Lecture:** the winner gives an all-expenses-paid plenary lecture at the associated Macro conference. This award has been inaugurated in memory of Bob Stepto, an extremely popular past President of the PD who died on 13 Sep. 2015, with an excellent obituary already published in *Chemistry International* (Jan. 2016, pp. 21-22). Chaired by Greg Russell, the judging panel unanimously decided on Michael Buback to be the initial winner.

Lastly, as per usual there will be 3 IUPAC (Student) Poster Prizes at Macro2016. All these awards emphasize IUPAC as a body that promotes highest quality, innovative chemistry.

Subcommittee on Polymer Terminology (SPT)

This is the PD's largest and most important subcommittee. Until the end of 2013 its chair was Dick Jones, whose massive contribution I wish to acknowledge. Since then Roger Hiorns has been in charge, and has continued to do a fine job. His report is in Appendix 3.

SPT meets every year, either immediately before (Macro years) or immediately after (GA years) the PD meeting. Minutes are copious and once finalized they are freely available from the IUPAC webpage. Typically there are 20-30 attendees and meetings last 3.5 days. These numbers give a feeling for the volume of work. Accordingly, SPT meetings are by far the PD's biggest expense, but they are a necessary expense because of the nature of the work: intense face-to-face discussion over every word and symbol is the only way to resolve terminology issues with rigor and finality. A great spirit of camaraderie develops, which then positively feeds back into people working harder and with more willingness for each other and the SPT cause.

The numerous projects and outputs of SPT are tabulated in Appendix 3. In addition to ongoing fundamental work, there is currently a general push to make SPT work more accessible in the form of 'brief guides'. This follows on from the tremendous success of the initial such venture, "A brief guide to polymer nomenclature" (*Pure Appl. Chem.* **2012**, *84*(10), pp. 2167-2169). The so-called "Purple Book", viz. *Compendium of Polymer Terminology and Nomenclature – IUPAC Recommendations 2008*, was made available online in 2014, thus extending the reach of this master-work.

Special mention should be made of the project “Updating Wikipedia”, which aims to have IUPAC definitions inserted on Wikipedia pages in branded, inviolable form. Two good examples of this are <https://en.wikipedia.org/wiki/Copolymer> and <https://en.wikipedia.org/wiki/Dispersity>. Whether we like it or not (and personally I don't mind it), Wikipedia is becoming a primary tool in the transmission of knowledge. This project is finding a role for IUPAC in this process.

Subcommittee on Polymer Education (SPEd)

Like SPT, SPEd meets annually as an add-on to PD meetings, although SPEd meetings usually only last 1-2 hours, cf. the 3.5 days of SPT meetings.

After approximately a decade at the helm, Werner Mormann stood down from being chair of SPEd at the end of 2014. I would like to thank him for his massive contribution in this role. Chris Ober has stepped in as interim chair, and now has two “co-chairs” to aid him, with a view to one of these replacing him as soon as the time is right. One of these two co-chairs, Chris Fellows, has prepared the report in Appendix 4. While SPEd continues to be well-known for its polymer education website – <http://iupac.org/polyedu/> remains the top hit when one Googles ‘polymer education’ – I would instead like to highlight the following initiatives of SPEd that are documented in Appendix 4:

- Continuation of support for the annually held PolyChar World Forums on Advanced Materials, including operation of 1-day workshops on polymer characterisation at PolyChar 22 (April 2014; Stellenbosch, South Africa), PolyChar 23 (May 2015; Lincoln NE, USA) and PolyChar 24 (May 2016; Poznan, Poland).
- Continuation of support for and operation of a postgraduate course in polymer science held annually at the Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Prague.
- Organization of a polymer education symposium as a component of both the Macro2014 and Macro2016 conferences.
- A new initiative is organisation of a half-day polymer education workshop (on chain-growth polymerization) in association with Macro2016 conference.

Subcommittee on Modeling of Polymerization Kinetics and Processes

The report for this Subcommittee is in Appendix 5. The subcommittee is co-chaired by Sabine Beuermann (a TM of the PD) and Robin Hutchinson (an AM), with yours truly the Past President. Over the last biennium there was a subcommittee meeting at Macro2014, just as there will be one at Macro2016. Additionally there were meetings in August 2014 at the 248th ACS National Meeting in San Francisco, and in December 2015 at Pacificchem in Honolulu. As all this implies, meetings are held at major conferences as the opportunity arises, which means there almost always is a meeting at Macro conferences.

The Subcommittee remains active in critically evaluating kinetic parameters of polymerization processes and in establishing reliable methodologies for measurement of rate coefficients. Outputs and current projects are detailed in Appendix 5. Ample justification for this approach is provided by the following table of output citations:

Rate coefficient	Publication journal	Year	Citations*
1. Styrene k_p	<i>Macromol. Chem. Phys.</i>	1995	540
2. Methyl methacrylate k_p	<i>Macromol. Chem. Phys.</i>	1997	415

3. Alkyl methacrylates k_p	<i>Macromol. Chem. Phys.</i>	2000	175
4. <i>n</i> -Butyl acrylate k_p	<i>Macromol. Chem. Phys.</i>	2004	213
5. RAFT mechanism	<i>J. Polym. Sci. A</i>	2006	293

* Obtained from Web of Science on 1 July 2015.

It is an extraordinary success for outputs of IUPAC projects to be so heavily cited.

Subcommittee on Structure and Properties of Commercial Polymers

Founded in the golden year of 1963, which means it celebrated its 50th anniversary in 2013 (in London), this remarkable subcommittee continues to churn out papers at a rate of approximately two per year, meaning it is now up to 92 publications in all, as documented in Appendix 6. This is an extraordinary record of sustained productivity, and evidences its ongoing currency. Logistically the subcommittee is divided into a western (European) chapter and an eastern (Asian) chapter, with each holding an annual meeting. These are freestanding events that are financed entirely by industry.

Concluding Thoughts

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 being people 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”.

One should not forget that traditional IUPAC work can be of great value even if it may not appear to be flashy. In Appendix 3 there is a quote about the value of SPT work from a director of the Chemical Patents department of a large multi-national company. The work of the Subcommittee on Structure and Properties of Commercial Polymers (Appendix 6) is almost entirely funded by industry because of the value it obtains from this work. Radical polymerization is carried out to the tune of 100 million tons per annum, and it is the Subcommittee on Modeling of Polymerization Kinetics and Processes (Appendix 5) that has provided benchmark rate coefficients for this process; the value of this work is reflected in the extraordinary citation rates for it (see above). Any NAO questioning the value of its subscription could be referred to this work. Perhaps IUPAC could be savvier in popularizing such “value propositions”, and probably it should adopt social media to trumpet and jazz up these messages. However none of this means that there is anything deficient about traditional IUPAC work. After all, if IUPAC doesn’t systematize chemical nomenclature and name chemical elements, then who will?

IUPAC POLYMER DIVISION (IV) – Appendix 1

Members (with NAOs)

Status	2016–17	2014–15
TM-President	Greg Russell (New Zealand)	Michael Buback (Germany)
TM-Past President	Michael Buback (Germany)	–
TM-Vice President	Christine Luscombe (USA)	Greg Russell (New Zealand)
TM-Secretary	Michael Walter (USA)	Michael Hess (Germany)
TM	Sabine Beuermann (Germany)	Sabine Beuermann (Germany)
TM	Jiasong He (China)	Jiasong He (China)
TM	Igor Lacík (Slovakia)	Bernadette Charleux (France)
TM	Mitsuo Sawamoto (Japan)	Mitsuo Sawamoto (Japan)
TM	Natalie Stingelin (UK)	Roger Hiorns (France)
TM	Yusuf Yagci (Turkey)	Graeme Moad (Australia)
TM	–	Werner Mormann (Germany)
AM	Roger Hiorns (France)	Igor Lacík (Slovakia)
AM	Michael Hess (Germany)	Dennis Smith (USA)
AM	Graeme Moad (Australia)	Yusuf Yagci (Turkey)
AM	Robin Hutchinson (Canada)	Robin Hutchinson (Canada)
AM	Rigoberto Advincula (USA) ¹	Tim Long (USA)
AM	Dietmar Auhl (Netherlands)	Dick Dijkstra (Germany)
NR	Cláudio dos Santos (Brazil)	Cláudio dos Santos (Brazil)
NR	Chain-Shu Hsu (China/Taipei)	Chain-Shu Hsu (China/Taipei)
NR	Jiři Vohlidahl (Czech Republic)	Jiři Vohlidahl (Czech Republic)
NR	Mario Malinconico (Italy) ²	Theo Dingemans (Netherlands)
NR	Doo Sung Lee (RoKorea)	Doo Sung Lee (RoKorea)
NR	Chin-Han Chan (Malaysia)	Chin-Han Chan (Malaysia)
NR	Ram Adhikari (Nepal)	Mohammad Siddiq (Pakistan)
NR	Olga Philippova (Russia)	Aziz Muzafarov (Russia)
NR	Voravee Hoven (Thailand) ³	Voravee Hoven (Thailand)
NR	Dick Jones (UK) ⁴	Dick Jones (UK)

Special notes:

1. Appointed by request of the Subcommittee on Structure and Properties of Commercial Polymers, of which he is secretary (see Appendix 6), replacing the retiring Dick Dijkstra as AM of this SC. This precluded Dingemans from being reappointed an NR, consistent with him not having any activity within IUPAC.
2. Not originally nominated by the Italian NAO due to personal reasons; when these resolved, it was requested that he replace the official nominee.
3. Appointed for a third term as NR due to high level of service.
4. Re-appointed an NR due to an exceptionally high level of service, even though Stingelin, also from the UK, was elected a TM.

IUPAC POLYMER DIVISION (IV) – Appendix 2

Inter-Divisional Appointments for 2016-17

Polymer Division members are known to be involved in other arms of IUPAC as follows:

- Bureau: **Chris Ober** (elected), **Greg Russell** (DP)
- IUPAC Standing Committees:
 - Chemical Research Applied to World Needs (CHEMRAWN): **Ram Adhikari** (NR), **Mario Malinconico**
 - Committee on Chemistry and Industry (COCI): **Robin Hutchinson** (division rep)
 - Committee on Publications and Cheminformatics Data Standards (CPCDS): **Cláudio dos Santos** (division rep)
 - Committee on Chemistry Education (CCE): **Chris Fellows** (AM), **Ram Adhikari** (NR), **Supawan Tantayon** (NR)
 - Interdivisional Committee on Terminology, Nomenclature and Symbols (ICTNS): **Graeme Moad** (division rep)
 - Project Committee (PC): not represented
 - Evaluation Committee (EvC): 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-II Jin** (TM), **Roger Hiorns** (division rep)
 - CCRF (Committee on Chemical Research Funding): **Chris Ober** (Bureau rep, also representing the PD)
 - Interdivisional Subcommittee on Materials Chemistry (ISMC): **Chris Ober** (chair), **Natalie Stingelin** (member)
 - Subcommittee on Green Chemistry (resides in Div. III): **Christine Luscombe** (member)
 - International Scientific Committee for the UNESCO-PhosAgro-IUPAC Programme: **Sabine Beuermann** (division rep)

IUPAC POLYMER DIVISION (IV) – Appendix 3

Report on Subcommittee on Polymer Terminology (SPT) for the Year to March 2016

By Roger Hiorns (Chair of SPT)

The 2015 meeting of the Subcommittee was held at the BEXCO Congress Centre, Busan, Korea, between the 10th and 13th of August 2015, in parallel to the IUPAC World Chemistry Congress which was held in the same town. The following 19 Members and Observers participated in the meeting: Prof. Rameshwar Adhikari (Nepal); Mr. Jiazhong Chen (USA); Prof. Chris Fellows (New Zealand); Prof. Alain Fradet (France); Prof. Melissa CHAN Chin Han (Malaysia); Prof. Jiasong He (China); Dr. Karl-Heinz Hellwich (Germany); Dr. Michael Hess (South Korea); Dr. Roger C. Hiorns (Chair, France); Prof. Christine K. Luscombe (Secretary, USA); Dr. Graeme Moad (Australia); Prof. Werner Mormann (Germany); Prof. Tamaki Nakano (Japan); Prof. Christopher K. Ober (Division IV Past-President, USA); Prof. Greg Russell (Division IV President, New Zealand); Prof. Stanisław Slomkowski (Poland); Prof. Natalie Stingelin (UK); Prof. Patrick Theato (Germany); and Dr. Paul Topham (UK).

In continuation of a move over the last few years to exploit electronic communication where possible, we were able to establish video (Skype) exchanges with the following participants who were otherwise unable to attend the meeting in person: Prof. Richard G. “Dick” Jones (UK); Prof. Cláudio dos Santos (Brazil); and Prof. Michael Walter (USA). Each was able to give a report. However, it was also found that the quality of the video was rather limited and that only a one way flow of information was feasible rather than an exchange.

The Minutes from the meeting were quickly produced and made available, in their provisional version, at: http://www.iupac.org/nc/home/about/members-and-committees/db/division-committee.html?tx_wfqbe_pi1%5Bpublicid%5D=401

The role of SPT is to produce documents that define terms in polymer science, and to make recommendations on the nomenclature of polymers on behalf of Division VIII. While it's work is not often cited, it is used greatly throughout academia, secondary and tertiary educational institutes, and perhaps most importantly in industry. This was brought home at the meeting with a quote from a director of the Chemical Patents department of a large multi-national company (turnover >5billion \$ pa) which stated, ‘In the drafting, prosecution and litigation of chemistry patents we are grateful if we can rely on exact nomenclature and definitions as provided by IUPAC, as this helps us to define the claimed scope of protection more precisely. In patent law clear and concise claims are also an important requirement for a patent to be valid. So your work is much appreciated.’

While many projects have been progressed throughout the year by electronic exchanges using e-mail and Skype, the importance of the face-to-face meetings must be stressed as they allow projects to advance much more quickly than by electronic communications alone. The process of discussion and debate between the members and observers is intrinsic to developing viable, useful systems of terminology and nomenclature.

Of particular note is the completion of the project, ‘2007-008-1-400 Multilingual Encyclopedia’, (dos Santos) which has been published as a Multilingual Polymer Glossary at: <http://www.iceb.ufop.br/dequi/iupac/polymerglossary/index.php>

as this project allows those who speak Czechoslovakian, French, German, Italian, Polish, Portuguese (from Brazil) and Spanish to gain direct access, for the first time, to IUPAC approved translations of terms and their definitions for polymers.

PROJECTS

In the period covered by this report, the Subcommittee has worked on 23 projects, of which five have been concluded successfully, with one very close to being finished. This state of closure was foreseen in the SPT meeting in Thailand in 2014 and since that time, much work has been done to ensure continuity by submitting new projects, specifically those which work at the interface between polymer science and other scientific fields. This is because there is a real need now in industrial, academic and educative spheres to develop authoritative terms and nomenclatures for quickly growing areas such as polymers in electronics, in advance materials engineering and in biology. Furthermore, IUPAC can play a strong and important role through developing tools that are easily accessible around the world on the internet.

With this in mind, there have been four successfully submitted projects (see section 5), and three more to come in the very near future (section 7, on polymer microstructure, on the extension of an internet site for the translation of terms for different languages, and on mechanical properties).

Output 2015-16 (to March 2016)

1. The following projects delivered the following publications:

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

Published as, '*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. Vohlídal, *Pure Appl. Chem.* **2015**; 87(1): 71–120.

- **1999-051-1-800 Modified – Jones**

Published as, '*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. Vohlídal,

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

2. One project is currently in public review:

- **2003-042-1-800:** Source-based nomenclature of single-strand organic polymers and copolymers*

3. The following projects are expected to be sent to public review before the next meeting:

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

4. The following projects are still in preparation with expected end-dates after July 2016:

- **2006-028-1-400:** Terminology for conducting, electro-active and field-responsive polymers
- **2008-015-1-400:** Preferred names for polymers
- **2009-047-1-400:** Definitions and notations relating to stereochemical aspects in polymer science
- **2010-007-1-400:** Terminology for chain polymerization
- **2010-036-1-400:** Keywords in polymer science journals
- **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)*
- **2012-001-1-400:** Terminology of nanomaterials and nanotechnology in polymer science
- **2012-048-3-400:** Brief Guide to Polymer Terminology
- **2013-001-1-800:** Structure-based nomenclature for regular linear star, comb and brush polymers*
- **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. The following projects have recently been accorded funding or extension or both:

- **2015-013-1-400:** Brief Guide to Polymerization Terminology – Luscombe
- **2015-014-1-400:** Guide (and Brief Guide) to Polymer Semiconductors – Walter
- **2015-032-2-400:** (Project Committee) Synchronizing Wikipedia: Polymer Definitions and

* Division VIII project pursued under the auspices of SPT.

Terminology – Hess

- **2013-049-1-400:** Terminology on separation of macromolecules – Hess
6. There are currently no projects submitted to IUPAC review for funding
7. The following application documents are in preparation for submission:
- Definition of terms relating to the ultimate mechanical properties of polymers – Adhikari
 - Brief Guide to Polymer Microstructure – Stingelin
 - Development of a multilingual glossary of polymer terminology with new languages (Project Committee) – dos Santos
 - Brief Guide to the Characterisation of Polymers – Hess
 - http of PB2 – Moad
 - Polymers from renewable and recycled sources – Vairon
 - Terminology for constitutionally-dynamic polymers

IUPAC POLYMER DIVISION (IV) – Appendix 4

Report on Subcommittee on Polymer Education (SPEd)

By Chris Fellows (Co-Chair of SPEd)

List of current SC members (together with country of affiliation for each):

Chair: Christopher Ober (USA)

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 the 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 Walter, M. G., Synchronizing Polymer Definitions and Terminology with Wikipedia, M. Hess and M. Walter, 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: 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):

July 4th 2014, Chiang Mai, MACRO-2014, 12 attendees

August 9th 2015, Busan, 48th IUPAC General Assembly, 17 attendees

IUPAC projects over this period, indicating which have been completed and which are still running (and giving 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. Kratochvil, complete

2013-053-1-400, *Polymer Education*, W. Mormann, complete

2014-040-1-400, *International Tutorial on Polymer Characterization - 23rd POLYCHAR Short Course*, M. Hess, complete

2015-032-2-400, *Synchronizing Wikipedia, Polymer Definitions and Terminology*, M. Hess, ongoing

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

IUPAC POLYMER DIVISION (IV) – Appendix 5

Report on Subcommittee on Modeling of Polymerization Kinetics and Processes

By Sabine Beuermann and Robin Hutchinson (Co-Chairs)

Objectives

Modeling and mechanistic studies into free-radical polymerizations are important for science and industry, but often completely different model assumptions and parameter values are reported for ostensibly the same systems. The projects of the IUPAC Subcommittee “Modeling of Polymerization Kinetics and Processes” are to rectify this situation through international collaboration, by producing critically evaluated kinetic parameters, whose values are reliable and which can be used by the international polymer community. Moreover, reliable methodologies have been established by the IUPAC Subcommittee. Benchmark propagation rate coefficients, k_p , have been obtained for styrene, many methacrylates, butyl and methyl acrylate, and methacrylic acid by critical evaluation and also by independent experiments. These efforts are currently extended to termination rate coefficients, initiation rate parameters, and reversible-deactivation radical polymerization kinetics.

Membership

Co-chairs: S. Beuermann (Clausthal, D), R. A. Hutchinson (Kingston, CAN)

Members: C. Barner-Kowollik (Karlsruhe, D), D. Bertin (Marseille, FR), M. Buback (Göttingen, D), M. Busch (Darmstadt TU, D), P. Castignolles (Western Sydney, AUS), B. Charleux (Paris, FR), M. Coote (Canberra, AUS), M Destarac (Toulouse, FR), D. D’hooge (Ghent, BE), T. Fukuda (Kyoto, JPN), Gaborieau (Western Sydney, AUS), R. G. Gilbert (Brisbane, AUS), A. Goto (Kyoto, JP), Y. Guillaneuf (Marseille, FR), S. Harriison (Toulouse, FR), A. M. van Herk (Singapore), P. Hesse (Ludwigshafen, D), J. P. A. Heuts (Eindhoven, NL), K. Hungenberg (Ludwigshafen, D), R. A. Hutchinson (Kingston, CAN), T. Junkers (Hasselt, BE), A. Kajiwara (Nara, JPN), T. Kitayama (Osaka, JPN), B. Klumperman (Stellenbosch, ZA), I. Lacík (Bratislava, SK), P. Lacroix-Desmazes (Montpellier, FR), J. R. Leiza (San Sebastián, ES), P. Lovell (Manchester, UK), K. Matyjaszewski (Pittsburgh, USA), G. Moad (Melbourne, AUS), M. Monteiro (Brisbane, AUS), D. Moscatelli (Milan, IT), A. N. Nikitin (Moscow, RUS), S. Perrier (Sydney, AUS), G. T. Russell (Christchurch, NZ), E. Sato (Osaka City, JPN), D. A. Shipp (Potsdam, USA), J.-P. Vairon (Paris, FR), P. Vana (Göttingen, D), J. Vorholz (Darmstadt, D), E. B. Wysong (Wilmington, USA), P. B. Zetterlund (Sydney, AUS), S. Zhu (Hamilton, CAN)

[total of 44 members from 16 countries]

Subcommittee Meetings (since 2014):

Saturday, 19 Dec, 2015 at Pacifichem (Honolulu USA) – 25 Attendees

Monday, Aug 11, 2014 at 248th American Chemical Society National Meeting (San Francisco, USA) – 12 Attendees

Tuesday, July 8, 2014 at “Macro2014” IUPAC World Polymer Congress, (Chiang Mai, Thailand) – 10 Attendees

Projects completed since 2014 (with associated publications):

- 1. Critically evaluated propagation rate coefficients for free-radical polymerization of water-soluble monomers polymerized in the aqueous phase (2004-034-1-400, I. Lacík)**

This project was completed with the 2015 publication addressing the accurate characterization of molar-mass distributions of poly(acrylic acid) (PAA) and poly(methacrylic acid) (PMAA) by size-exclusion chromatography (SEC) (*Macromol. Chem. Phys.* **2015**, *216*, 23-37). It should be noted that the first paper from this project (*Pure Appl. Chem.* **2007**, *79*, 1463-1469) has received 40 citations (Web of Science, accessed 04 Mar 2016).

- 2. Critically evaluated rate coefficients associated with initiation of radical polymerization (2009-050-1-400, G. Moad)**

This project has resulted in a review article written for *Prog. Polym. Sci.* (submitted 2015) by Graeme Moad on recommended values for the decomposition rate constants (k_d) and efficiencies (f) of azo initiators. As a result of the review process, it has been expanded to include recent data from reversible-deactivation radical polymerization and from heterogeneous polymerizations (revised version currently under review). Once accepted for publication, a follow-up synopsis of the kinetic data will be prepared for *Pure Appl. Chem.*, finalizing this project.

- 3. Critically evaluated rate coefficients for (methyl) acrylate propagation (2011-034-2-400, C. Barner-Kowollik and T. Junkers)**

This project was completed with the 2014 publication that critically evaluated and provided a benchmark dataset for the propagation rate coefficient for radical polymerization of methyl acrylate (MA) in the bulk (*Polym. Chem.* **2014**, *5*, 204-212). It should be noted that this new publication already has received 18 citations, continuing the story of this highly successful series of IUPAC benchmark data sets on radical propagation kinetics.

Ongoing projects:

- 4. Critically Evaluated Dissociation Rate Coefficients for Alkoxyamines (Project 2010-027-2-400, Y. Guillaneuf)** The project on the nitride mediated polymerization was delayed due to personal matters of the task leader (Y. Guillaneuf). Since mid 2015, the task leader was back to full time and the project was restarted at the Pacifichem conference (dec. 2015). New member was included (D. D'hooge) and the task leader is supposed to send an update of the collected data mid 2016 to the group members. If no more data are available, the processing of such data will be done and conclusion presented in a publication that is expected for 2017.
- 5. Critically Evaluated Rate Parameters for Chain-length-Dependent Termination Kinetics in Radical Polymerization of Styrene and Methyl Methacrylate (Project 2013-051-1-400, G. Russell)** Data collection and discussions underway.
- 6. Critically Evaluated Propagation Rate Coefficients for Radical Polymerization: Vinyl Esters (Project 2013-045-1-400, R. A. Hutchinson)** Data set for vinyl acetate propagation kinetics has been collected and analyzed, and a first draft of the manuscript (to be submitted to *Macromol. Chem. Phys.* or *Polym. Chem.*) is being finalized to circulate to the project members.

7. **Critically Evaluated Rate Coefficients for Radical Polymerizations of Styrene (Project 2013-047-1-400, S. Beuermann)**. Data collection and discussions underway.
8. **Critically Evaluated ESR (EPR) Spectra of Important Polymerization-Related Radicals (Project 2015-047-1-400, A. Kajiwara)**. New project, just initiated.

IUPAC POLYMER DIVISION (IV) – Appendix 6

Report on Subcommittee on Structure and Properties of Commercial Polymers

By Jiasong He (Co-Chair)

Highlights of this Subcommittee

The balanced membership base from industry and academia works to ensure that projects accommodate need, scientific novelty and application value.

I. Membership (as of November 2015)

No.	Title	Firstname	Surname	Company	Country	Duty
1	Prof	Jiasong	He	Institute of Chemistry, Chinese Academy of Sciences (CAS)	China	Chair
2	Dr	Iakovos	Vittorias	Basell Polyolefine	Germany	Chair
3	Dr	Dietmar	Auhl	Maastricht University	Netherlan ds	Secretary
4	Prof	Chang- Sik	Ha	Pusan National University,	Korea	Chair of East Asia Research Meeting
5	Prof.	Soonho	Lim	Korea Institute of Science and Technology	Korea	Secretary, East Asia Research Meeting
6	Prof	Volker	Altstaedt	University Bayreuth	Germany	
7	Prof	Lijia	An	Changcun Institute of Applied Chemistry, CAS	China	
8	Dr	Rob	Bailey	Winton Materials Science ,	United Kingdom	
9	Prof	Clive	Bucknall	Cranfield University	United Kingdom	
10	Dr.	Choon	Chai	INEOS services Belgium N.V.	Belgium	
11	Prof.	Peng	Chen	Ningbo Institute of Material Technology and Engineering, CAS	China	
12	Prof.	Ildoo	Chung	Pusan National University	Korea	
13	Dr	Dick	Dijkstra	Bayer MaterialScience	Germany	

14	Dr	Nicolas	Dufaure	Arkema	France	
15	Dr	Martina	Finke	Evonik	Germany	
16	Dr	Ivan	Fortelny	Institute of Macromolecular Chemistry, Academy of Sciences CR	Czech Republic	
17	Dr.	Claus	Gabriel	BASF	Germany	
18	Dr	Andrzej	Galeski	Centre of Molecular and Macromolecular Studies	Poland	
19	Dr	Binnur	Gunesin	Dutoit/Gunesin Consulting Services	Switzerland	
20	Dr.	Meifang	Guo	Beijing Research Institute of Chemical Industry (BRICI), SINOPEC	China	
21	Dr	Mijeong	Han	Korea Research Institute of Chemical Technology	Korea	
22	Dr.	Ulrich	Handge	Institut fuer Polymerforschung, Helmholtz-Zentrum Geesthacht	Germany	
23	Dr.	Sven	Hobeika	Bayer MaterialScience AG	Germany	
24	Prof.	Wenbing	Hu	Nanjing University	China	
25	Prof	Dae Woo	Ihm	Hoseo Univ., Dept. of Innovative Industrial Tech.	Korea	
26	Dr	Tadashi	Inoue	Kyoto University	Japan	
27	Dr.	Takaharu	Isaki	Mitsui Chemicals, Inc.	Japan	
28	Dr	Akihiro	Izuka	Polyplastics Co., Ltd.	Japan	
29	Prof	Dukjoon	Kim	Sungkyunkwan University	Korea	
30	Prof	Seong Hun	Kim	Hanyang University	Korea	
31	Prof	Sung Chul	Kim	KAIST	Korea	
32	Profes s	Jin Kon	Kim	Pohang University of Science and Technology	Korea	
33	Dr.	Jochen	Kroll	Lanxess	Germany	

34	Dr	Sunghun	Kwon	Jeil chemical co.,ltd	Korea	
35	Prof	Martin	Laun	BASF AKTIENGESELLSCHAFT	Germany	
36	Dr	Young Keun	Lee	SK Energy	Korea	
37	Prof	Doo Sung	Lee	Sungkyunkwan University	Korea	
38	Dr.	Jae Heung	Lee	Korea Research Institute of Chemical Technology	Korea	
39	Dr	Bong Keun	Lee	LG Chemical	Korea	
40	Prof.	Jun Young	Lee	Sungkyunkwan University	Korea	
41	Prof	Won-ki	Lee	Pukyong National University	Korea	
42	Prof.	Chen- Yang	Liu	Institute of Chemistry, CAS	China	
43	Dr	Shu-ichi	Maeda	Ube Industries, Ltd.	Japan	
44	Mr.	Marc	Mangnus	Dow Benelux NV	Netherlands	
45	Prof.	Frans	Maurer	University of Lund	Sweden	
46	Dr	Yongfeng	Men	Changchun Institute of Applied Chemistry, CAS	China	
47	Prof. Dr.	Goerg H.	Michler	Martin Luther University Halle-Wittenberg	Germany	
48	Prof.	Koh-hei	Nitta	Kanazawa University	Japan	
49	Prof.	Masahito	Oka	Osaka Prefecture University	Japan	
50	Dr	Ewa	Piorkowska-galeska	Centre for Molecular and Macromolecular Studies	Poland	
51	Dr.	Jinliang	Qiao	China Petroleum and Chemical Corporation (SINOPEC)	China	
52	Dr	Maximilian	Ruellmann	BASF	Germany	
53	Dr	Dirk	Schubert	Freudenberg Forschungsdienste AG	Germany	
54	Prof.	Tongfei	Shi	Changchun Institute of Applied Chemistry, CAS	China	

55	Dr.	Miroslav	Slouf	Institute of Macromolecular Chemistry AS CR, v.v.i.	Czech Republic	
56	Dr.	Helge	Steininger	BASF Aktiengesellschaft	Germany	
57	Mr	Dave	Stocks	Intertek MSG	United Kingdom	
58	Prof	Zhaohui	Su	Changchun Institute of Applied Chemistry, CAS	China	
59	Dr	Katsunori	Takahashi	Sekisui Chemical Co. Ltd.	Japan	
60	Prof	Toshikazu	Takigawa	Kyoto University	Japan	
61	Prof.	Katsuhisa	Tokumitsu	University of Shiga Prefecture	Japan	
62	Prof.	Kenji	Urayama	Kyoto Institute of Technology	Japan	
63	Dr.	Rainer	Walkenhorst	Ticona GmbH, Tech. Marketing GUR	Germany	
64	Dr	Xiaoqing	Wang	Beijing Institute of Technology	China	
65	Prof.	Liangshi	Wang	Beijing Research Institute of Chemical Industry (BRICI), SINOPEC	China	
66	Prof	Yanwei	Wang	Soochow University	China	
67	Dr	Erik	Wassner	BASF	Germany	
68	Prof	Donghua	Xu	Changchun Institute of Applied Chemistry, CAS	China	
69	Prof	Masayuki	Yamaguchi	Japan Advanced Institute of Science and technology	Japan	
70	Dr.	Wentao	Zhai	Ningbo Institute of Material Technology and Engineering, CAS	China	
71	Dr	Wim	Zoetelief	DSM Ahead Materials Sciences R&D	Netherlands	

Breakdown of current members by country:

Country	Total Members	From Industry	From Academia
Belgium	1	1	0
China	15	3	12
Czech Republic	2	0	2
France	1	0	1
Germany	15	12	3
Japan	11	3	8
Korea	16	3	13
Netherlands	3	2	1
Poland	2	0	2
Sweden	1	0	1
Switzerland	1	1	0
United Kingdom	3	2	1
Total	71	27	44

II. Activities and achievements during 2014-2015 biennium and the first part of 2016**II.i. Subcommittee publications up to now (reported in 2014 and 2015):**

[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 Reoroji Gakkaishi (J. Soc. Rheol., Jpn.)*, 2013, 41 (3), 129

[91] K. Wang, F. Wu, W. Zhai*, W. Zheng, Effect of Polytetrafluoroethylene on the Foaming Behaviors of Linear Polypropylene in Continuous Extrusion, *J. Appl. Polym. Sci.*, 129: 4 (2013).

[92] M. Laun, D. Auhl, R. Brummer, Dirk J. Dijkstra, C. Gabriel, M. A. Mangnus, M. Rüllmann, W. Zoetelief, U. A. Handge*, Guidelines for checking performance and verifying accuracy of rotational rheometers: viscosity measurements in steady and oscillatory shear (IUPAC Technical Report), *Pure Appl. Chem.*, 86: 1945–1968 (2014).

(Note that the numbers above refer to Subcommittee publication number since inception 50 years ago.)

II.ii. Meetings:

- Subcommittee Meeting No. 72
Hosted by Prof. Volker Altstaedt
April 28- 30, 2014, Bayreuth, Germany
20 participants (academia 11/industry 9) from 7 countries
- Subcommittee EA Research Meeting (No. 72A)
Hosted by Prof. He
November 19-20, 2014, Luoyang, China
20 participants (academia 15/industry 5) from 3 countries
- Subcommittee Meeting No. 73
Hosted by Dr. Slouf
April 22- 24, 2015, Prague, Czech Republic
27 participants (academia 17/industry 10) from 8 countries
- Subcommittee EA Research Meeting (No. 73A)
Hosted by Prof. Ha
November 4-5, 2015, Busan, Korea
18 participants (academia 16/industry 2) from 3 countries

II.iii. Forthcoming meetings:

- Subcommittee Meeting No. 74
Hosted by a professor from Aristotle University
May 23-25, 2016, Rhodes, Greece
- Subcommittee EA Research Meeting (No. 74A)
Hosted by Prof. Tokumitsu
Nov.17- 18, 2016, Hikone, Japan

II.iv. Completed projects:

1. IUPAC No. **2010-029-3-400**
Relation between rheological properties and foam processability for polypropylene
Task Group Leader: Prof. M. Yamaguchi, JAIST, Japan
2. IUPAC No. **2005-023-2-400**
Microstructural, melt processing and mechanical properties of compatibilised PA6/ABS Blends
Task Group Leader: Dr. Helge Steininger, BASF SE, Germany

Currently running IUPAC projects:

1. 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. After a couple of revisions, we hope it will be accepted soon.
2. IUPAC No. **2008-028-1-400**

Elongational rheometry devices for shear rheometers

Task Group Leader: Dr. Dietmar Auhl, Maastricht University, The Netherlands

Dietmar, Iakovos and Ullrich have started writing a paper.

3. 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

Many results were presented during April meeting, 2015. This project has been running for 4 years, and is now planned to extend to December 2016.

Five drafts are planned to finalize the project:

- PAC report;
- Solution and melt viscometry for molar mass analysis;
- Thermal analysis, high-pressure crystallisation, flash-DSC;
- Micromechanics (entanglement and grain boundaries), indentation, creep compared with macromechanics;
- Macromechanics (crack, yield, wear, fatigue, etc.).

IUPAC POLYMER DIVISION (IV) – Appendix 7

Report on IUPAC-Endorsed Conferences of the Polymer Division

By Igor Lacík (TM Responsible for Evaluation of AIS)

The IUPAC label for conferences organized within the Polymer Division is of interest to around 10 conferences per year (the list of IUPAC-endorsed conferences in years 2015 and 2016 is below).

The organizers typically follow the rules and recommendations in their Applications for IUPAC Sponsorship (AIS). In case some of them are not obeyed, the organizers amend the AIS in communication with IUPAC Polymer Division (myself, president, Mrs. Enid Weatherwax from the IUPAC secretariat) prior to approval.

For the future, I would like to suggest several changes to the IUPAC-endorsement process:

- The AIS form (and all related documents) should change from “Application for IUPAC Sponsorship (AIS)” to “Application for IUPAC Endorsement (AIE)”. This is because IUPAC does not grant financial sponsorship, but actually lends the endorsement of the IUPAC label.
- With respect to criteria for endorsement, two of them are difficult to evaluate:
 1. Participation of industrial chemists as speakers and as members of the International Advisory Board
 2. Participation of women as speakers and as members of the International Advisory Board

The factor of geographic diversity for members of the International Advisory Board is the main criterion that is observed. On the other hand, information on both affiliation and gender is often hidden. There was good reason to include these criteria in AIS. Nevertheless, in order to really enforce them, I recommend finding a way to “label” both the International Advisory Board members from academia vs industry and the gender in the new AIE form. If not, criteria 1 and 2 should not be called criteria but only recommendations.

PD conferences approved for endorsement in 2015:

1. **23rd World Forum on Advanced Materials (POLYCHAR 23) 2015**, May 12 – 15, Lincoln, Nebraska, USA (Chairman: Prof. Mehrdad Negahban)
2. **European Polymer Congress 2015**, June 21 - 26, Dresden, Germany (Chairman: Prof. Brigitte Voit)
3. **79th Prague Meeting on Macromolecules: Functional Polymers at Bio-Material Interfaces**, June 28 –July 2, 2015, Prague, Czech Republic (Chairman: Dr. František Rypáček, PhD)
4. **22nd International Symposium on Ionic Polymerization (IP-2015)**, July 5 – 10, Bordeaux University, Talence, France (Chairman: Prof. Stéphane Carlotti)

5. **35th Australasian Polymer Symposium (35APS)**, July 12 – 15, Gold Coast, Queensland, Australia (Chairman: Prof. Amanda Ellis)
6. **16th International Symposium on Macromolecular Complexes (MMC-16)**, Aug 10 – 14 2015, Wroclaw, Poland (Chairman: Prof. Andrzej W. Trochimczuk)
7. **45th IUPAC World Chemistry Congress**, August 9–14 2015, Busan, Republic Of Korea (Chairman: Prof. Myung Soo Kim)
8. **4th Federation of Asian Polymer Societies - International Polymer Congress (4th FAPS-IPC 2105)**, October 5 – 8 , Kuala Lumpur, Malaysia (Chairman: Professor Dr. Rusli Daik)
9. **11th International Conference on Novel Materials and their Synthesis (NMS-XI)**, October 11 – 16, Qinhuangdao, China (Chairman: Prof. Yuping Wu)
10. **11th International Conference on Advanced Polymers via Macromolecular Engineering (APME 2015)**, October 18 – 22, Yokohama, Japan (Chairman: Prof. Takeshi Endo)

PD conferences approved for endorsement in 2016:

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)
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. **MACRO 2016 - 46th IUPAC World Polymer Congress**, July 17 - 21 2016, Istanbul, Turkey (Chairman: Prof. Yusuf Yagci)
6. **The 15th International Conference on Molecule-Based Magnets (ICMM2016)**, September 4 - 8 2016, Sendai, Japan (Chairman: Prof. Masahiro Yamashita)
7. **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)
8. **80th Prague Macromolecular Meeting, Self-assembly in the World of Polymers**, July 10 – 14 2016, Prague, Czech Republic (Chairman: Dr. Petr Štěpánek)
9. **36th Australasian Polymer Symposium**, November 20 – 23 2016, Lorne, Victoria, Australia (chairman: Prof Greg Qiao), pending