



## Educational Workshop in Polymer Sciences 2016

*in conjunction with MACRO2016, Istanbul*

Theme: Polymer synthesis

Date: Sunday, 17 July 2016

Time: 12.00 pm to 4.30 pm

Haliç Congress Center, Istanbul, Turkey



### Synopsis

This interactive educational workshop on polymer synthesis is suited for postgraduates or researchers from all countries to up-date their knowledge by interactive oral lectures. All the 4 lectures shall touch on the understanding of the basic science, terms and concepts that are critical to chain-growth polymerization with a particular emphasis on radical polymerization and hence resulted in thought-provoking impulses on the experimental design coupled with the results and discussion of research. It will provide a secure ladder for the young researchers or practitioners to progress from a primary level to an advanced level without much difficulty. Before the workshop, the lecturers may share their powerpoint slides on the website of the IUPAC sub-committee on Polymer Education accessible to the general public.

### Who should attend

Postgraduates, higher level undergraduates and other researchers in polymer chemistry.

### Program

The educational workshop is a set of lectures by experts in the field describing different aspects of interest to the participants of MACRO2016. The following topics will be presented.

Time	Lecture	Speaker
12.00 pm	Registration	
	<b>Educational workshop</b>	
12.15 pm – 1.00 pm	Radical polymerizations I – chain growth basics	Prof. Dr. Devon A. Shipp
1.00 pm – 1.45 pm	Radical polymerizations II – special cases	Prof. Dr. Devon A. Shipp
	<b>Special tutorial</b>	
1.45 pm – 2.30 pm	Size-exclusion chromatography as a useful tool for the assessment of polymer quality and determination of macromolecular properties	Dr. Peter Kilz

Time	Lecture	Speaker
<b>Educational workshop</b>		
2.30 pm – 3.00 pm	Tea break	
3.00 pm – 3.45 pm	Radical Addition-Fragmentation and RAFT polymerization I	Dr. Graeme Moad / Assoc. Prof. Dr. Chris Fellows
3.45 pm – 4.30 pm	Radical Addition-Fragmentation and RAFT polymerization II	Dr. Graeme Moad / Assoc. Prof. Dr. Chris Fellows
4.30 pm	Grand opening and plenary lectures of MACRO2016	

## Speakers' profile



**Prof. Dr. Devon A. Shipp** completed a B.Sc. (Hons) in chemistry (1993), and then Ph.D. (1998) at the University of Melbourne (Australia) under the supervision of Prof. David Solomon, Dr. Graeme Moad and Dr. Trevor Smith. He then accepted the Bayer Postdoctoral Research Fellowship at Carnegie Mellon University (Pittsburgh, Pennsylvania) with Prof. Kris Matyjaszewski. In 1999 he began his independent research career at Clarkson University in northern New York State where he currently full Professor and Chair of the Department of Chemistry & Biomolecular Science. His research group focuses on new polymer chemistries, particularly radical polymerizations, nanocomposites, and degradable polymers for bio-medical applications. He has published ~65 peer-reviewed papers, and currently is an Associate Editor for the *Australian Journal of Chemistry*. He was a Fulbright Scholar in Slovenia in 2015, hosted by the Slovenian National Institute of Chemistry and the Faculty of Chemistry and Chemical Technology at the University of Ljubljana. His website URL is: [www.clarkson.edu/~dshipp](http://www.clarkson.edu/~dshipp).



**Dr. Peter Kilz**, author or co-author of more than 40 scientific papers, is Director for Software, Systems and Services at PSS Polymer Standard Service, a company with world-wide presence which is specializing in the solution characterization of macromolecules. Prior to this position he was working at PSS on tailoring polymer-based particles for chromatography, for selective removal of trace-level compounds and as micro reactors in various market segments. Dr. Kilz studied chemistry and the Universities of Mainz (with Prof. A.H.E. Müller) and Liverpool (with Prof. A. Ledwith). His research interests include characterization of molecular and chemical structure of synthetic and natural macromolecules by various chromatographic techniques as well as light scattering, viscometry, mass spectroscopy, and advancing the elucidation of structure-property-function relationships. He is well-known as an expert in 2-dimensional chromatography and a reviewer for many scientific journals.



**Dr. Graeme Moad** obtained his BSc (Hons, First Class, 1974) and PhD (1978) from the University of Adelaide in organic free radical chemistry. Between 1977 and 1979, he undertook post-doctoral research at Pennsylvania State University with Prof Steven J. Benkovic in the field of biological organic chemistry. He joined CSIRO in 1979 where he is currently a CSIRO fellow. Dr Moad is (co)author of over 180 publications, co-inventor of 34 patent families and co-author of the book "The Chemistry of Radical Polymerization". His research interests lie in the fields of polymerization mechanism, and polymer design and synthesis. In recognition of his work Dr Moad was awarded a CSIRO medal in 2003, the RACI's Battaerd-Jordan Polymer Medal in 2012, a ATSE Clunies Ross Award and a Thomson-Reuters Citation Laureate in 2014. Dr Moad is an adjunct professor at Monash University and the University of New England and an honorary professor at the Beijing University of Chemical Technology. He is an associate member of the IUPAC Polymer Division and a Fellow of the Royal Australian Chemical Institute and the Australian Academy of Science.



**Assoc. Prof. Dr. Chris Fellows** - obtained his BSc (Hons, First Class, 1993) and PhD (1998) from James Cook University in free radical polymer chemistry with A/Prof Ernest Senogles. Since 2004 has been a member of academic staff at the University of New England (Australia). Assoc. Prof. Dr. Fellows has research interests in polymerization mechanisms and kinetics, in the application of polymers to processes occurring at interfaces, and in structure/property relations in cereal foods, with about 70 peer-reviewed publications in these areas. Assoc. Prof. Dr. Fellows is a Fellow of the Royal Australian Chemical Institute and a member of the IUPAC Committee on Chemical Education.

## Abstracts

### Prof. Dr. Devon A. Shipp

Both fundamental and novel aspects of radical polymerizations will be discussed in these presentations. Beginning with basic radical chain-growth polymerization, we will explore the various reaction mechanisms involved and their rates, and polymer molecular weights and distributions. The effect of reaction conditions, such as temperature, solvent, concentrations, comonomers, etc, on polymerization outcomes will be discussed. The second part will focus on recent developments in radical polymerizations, including a brief description of reversible deactivation radical polymerizations such as atom transfer radical polymerization (ATRP) and nitroxide-mediated polymerization (NMP). Step-growth radical polymerizations, such as thiolene polymerizations, will also be discussed and compared to tradition chain-growth radical polymerizations.

### Dr. Peter Kilz

Macromolecules play an important role in almost every aspect of our life spanning from proteins to synthetic polymers. The control of product quality and product performance as well as understanding structure-property-function relationships are crucial for the use and design of optimized and sustainable use of macromolecules. This requires comprehensive analytical techniques to characterize various properties from molecular to macroscopic scale.

The major advantage of chromatography lies in its ability to separate macromolecules and determine the property distributions, which are key to fine-tuned products and applications. The combination of GPC/SEC as a separation technique with intelligent (multi-) detection like on-line viscometry, light scattering and/or spectroscopic techniques like infrared spectroscopy or mass spectrometry allows for further in-depth investigation of e.g. physical, compositional, structural aspects in each analytical fraction.

This presentation will present an overview of different GPC/SEC methodologies to study macromolecules on the molecular level. Various detection techniques will be described to characterize complex macromolecules with regard to molar mass distribution, chemical composition distribution, molecular architecture distribution, functionality type distribution. The potential and limitations of individual technique will also be compared.

### Dr. Graeme Moad

RAFT (radical addition fragmentation chain transfer) Polymerization is currently one of the most versatile and most used methods for implementing reversible deactivation radical polymerization (RDRP) otherwise known as controlled or living radical polymerization. This paper will briefly trace the historical development of RAFT with reference to the kinetics and mechanism of the process. It will also highlight the most recent developments at in our laboratories CSIRO specifically covering such areas as kinetics and mechanism, RAFT agent development, end group transformation, RAFT crosslinking polymerization, monomer sequence control, multi-block copolymer synthesis and high throughput RAFT polymerization. Moad, G. In *Controlled Radical Polymerization: Mechanisms*; Matyjaszewski, K., Sumerlin, B. S., Tsarevsky, N. V., Chieffari, J., Eds.; American Chemical Society: 2015; Vol. 1187, p 211.

### **Fee**

- (1) Complimentary for the participants of MACRO2016 OR
- (2) USD 100 for workshop delegates

### **Payment mode**

Please refer to this web link

[http://macro2016.org/Educational\\_Workshop.asp](http://macro2016.org/Educational_Workshop.asp)

### **For more information, please contact**

#### **Organization Secretariat**



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