Educational Workshop in Polymer Sciences 2018

in conjunction with MACRO2018, Cairns

Theme: **Polymer processing**

Date: **Sunday, 1 July 2018**

Time: **12.30 pm to 4.35 pm**

Cairns Convention Centre, Australia

Synopsis

This interactive educational workshop on polymer processing is suited for postgraduates or researchers from all countries to up-date their knowledge by interactive oral lectures. All the 3 lectures shall touch on the understanding of the basic science, terms and concepts that are critical to polymer processing from laboratory scale to pilot scale. Thought-provoking insights into the experimental design, process optimization and the research results will be presented. This will provide a basis also for understanding research reports during the following days of the conference. Before the workshop, the instructors may share their power point 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 processing in relevant manufacturing industries.

Fees for 1-day Short Course on Polymer Characterization

1. Complimentary for the participants of MACRO2018 **OR**
2. $AUD200 for solely attending Educational Workshop on Polymer Processing

Payment mode

Please refer to this web link
http:// www.macro18.org

Tentative program

The educational workshop is a set of lectures by experts in the field describing different aspects of interest to the participants of MACRO2018. The following topics will be presented.

Time	Lecture	Speaker
12.00 pm	Registration	
12.25 pm – 12.30 pm	Welcoming speech by the Co-chair of IUPAC Project under Polymer Education Subcommittee	
12.30 pm – 1.00 pm	Fabrication of polymer membranes I	Prof. Dr. Volker Abetz Click ***here*** for lecture notes
1.00 pm – 1.30 pm	Fabrication of polymer membranes II	Prof. Dr. Volker Abetz Click ***here*** for lecture notes
1.30 pm – 1.45 pm	Short break	
1.45 pm – 2.15 pm	Aqueous microgels: From tailored synthesis to fabrication of multifunctional materials I	Prof. Dr. Andrij Pich Click ***here*** for lecture notes
2.15 pm – 2.45 pm	Aqueous microgels: From tailored synthesis to fabrication of multifunctional materials II	Prof. Dr. Andrij Pich Click ***here*** for lecture notes
2.45 pm – 3.00 pm	Short break	
3.00 pm – 3.30 pm	Polymer processing: Process considerations and optimization for biobased and green polymers I	Prof. Dr. Peter Halley Click ***here*** for lecture notes
3.30 pm – 4.00 pm	Polymer processing: Process considerations and optimization for biobased and green polymers II	Prof. Dr. Peter Halley Click ***here*** for lecture notes
4.00 pm – 4.05 pm	Closing of workshop by Chairman of IUPAC Polymer Education Sub Committee	
4.10 pm	Grand opening and plenary lectures of MACRO2018	

For more information, please contact

Organization Secretariat

MACRO2018 Secretariat
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MORE with IUPAC Polymer Education

Abstracts

Prof. Dr. Volker Abetz
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After an overview on membrane applications and the various membrane geometries being in use, different production technologies for polymer membranes will be presented and discussed, such as the phase inversion process and thin film composite membrane production. Both flat sheet and hollow fiber membrane production will be considered.
The choices of polymer, membrane structure, and membrane geometry depend on the separation task. While dense membranes are useful for molecular separations like gas separation (carbon dixide separation from natural gas or combustiona air, nitrogen separation from oxygen, organic nanofltration to separate fine chemicals from other organic compounds in chemical production, desalination of water by reverse or forward osmosis), porous membranes are often applied for water purification by filtering particles, bacteria and viruses, or separation of proteins and other functional macromolecular compoundsin biotechnological processes. Besides homopolymers also random copolymers and block copolymers are useful and their final membrane properties can be influenced not only by their chemical composition, but also by the membrane preparation. Besides the physical processes of membrane preparation, also chemical reactions may play a role. During membrane formation interfacial polymerisation can lead to thin flm composite membranes, or chemical post treatments may be applied to affect membrane surface properties (antifouling), membrane porosity (etching) or its free volume (thermal rearrangement).

Prof. Dr. Andrij Pich
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Synthesis of aqueous microgels can be performed in controlled way to tune particle size and size distribution, chemical functionality, surface charge, swelling degree, and colloidal stability. Aqueous microgelsexhibit unique properties like reversible deformability, surface activity, and stimuli-responsiveness. Microgelscan display sensitivity to temperature, pH, light, ionic strength *etc*.

The post-polymerization modification reactions provide a toolbox for incorporation of small organic molecules, synthetic polymers, biopolymers or inorganic nanoparticles into colloidal microgel network thus leading to the formation of multifunctional colloids. Such colloids may exhibit electrical conductivity, magnetic response or optical and catalytic activity.

Tailored microgels can be used as building blocks for the preparation of well-ordered nanostructured materials of different dimensions and complexity. By controlled self-assembly of microgels in solution, on interfaces or surfaces defined macromolecular architectures can be obtained. Microgels can be deposited on different surfaces to design antibacterial or protein-repelling coatings. Mixtures of microgels and linear polymers can be processed by electrospinning to obtain stimuli-responsive microfibers for wound healing applications. The details of the fabrication processes and properties of microgel-based materials will be discussed.

Prof. Dr. Peter Halley
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This session will focus on polymer processing considerations and optimisation of new sustainable and bio-based polymer products. A range of processing techniques from film blowing, injection molding, extrusion and reactive extrusion will be mentioned. Wider consideration of characterisation, property testing and degradation/disposal will be discussed in relation to each processing method. Processing products in applications for agriculture, packaging and drug delivery will be discussed.

Speakers' profile

Prof. Dr. Volker Abetz studied chemistry at the University of Freiburg, where he received his diploma in 1987 and his doctoral degree in 1990 under the supervision of Prof. Dr. Reimund Stadler. In his doctoral thesis he developed dichroic and birefringent methods to study orientation behavior of multicomponent polymer melts and networks under shear and uniaxial extension, partly in collaboration with Prof. Gerry Fuller at the Stanford University, California. Then he joined the polymer physics group at the Max-Planck-Institute for Polymer Research in Mainz, where he worked on structure and dynamics of polymer blends until 1993. After working on the structure formation of interpenetrating polymer networks during a half year visit with a stipend from the European Capital and Humanity Program at the Institut Charles Sadron in Strasbourg he went to the Institute of Organic Chemistry at the University of Mainz, where he started to work on the morphological behavior of block copolymers. In 1997 he moved to the University of Bayreuth, where he finished his habilitation on the synthesis and morphological behavior of ternary block copolymers at the Chair for Macromolecular Chemistry in 2000. In 2004 he was appointed an associate professor position for Polymer Chemistry at the University of Potsdam and in the same year he accepted the position as a head of the Institute of Polymer Research of the Helmholtz-Zentrum Geesthacht, together with a position as a full professor position at the Faculty of Technology at the University of Kiel. He continued the work in the area of tailor made block copolymers and extended the scope of these materials successfully to membranes, besides initiating the institute's present activities in nanostructured materials for structural applications. In 2009 he was offered a chair position of the Leibniz-Institute for New Materials together with a full professor position for Chemical Material Sciences at the University of Saarland in Saarbrücken, which he declined. Presently he holds an offer for a full professor position for Physical Chemistry at the University of Hamburg. He is coordinator of several European projects, edited two volumes in Advances of Polymer Science and is author of several book chapters and more than 200 original publications.

After studying chemical technology at State University Lvivska Polytechnikain Lviv/Ukraine **Prof. Dr. Andrij Pich** received his PhD from Technical University Dresden in 2001. In 2006/2007, he was a postdoctoral fellow at the University of Toronto/Canada. In 2007, he received the Georg Manecke Award of the GDCh (German Chemical Society) and completed his habilitation in 2008 at Technical University Dresden. Prof. Dr. Andrij Pich was appointed in 2009 to Lichtenberg Professor for Functional and Interactive Polymers at RWTH Aachen University with a Volkswagen Foundation sponsorship.His research fields are synthesis of functional polymers and polymer colloids with variable chemical structures and morphologies and their utilization for design of composite materials.

Prof. Dr. Peter Halley is a professor and head of school of chemical engineering at the University of Queensland (UQ). He works at the translational research interface between universities and industry. He has worked in industry (SRI international, Sola Optical, Moldflow), has worked in three cooperative research centres (CRCs), has acquired and managed continuous government and industry research projects since 1994, was heavily involved in the spinoff of Plantic Technologies from the CRC food packaging in 2002, and was involved in the research that led to the TenasiTech (TPU nanocomposite) spinoff from UQ in 2007. His research focus now is bio-based polymers and materials. He has affiliate positions in the Australian institute for bioengineering and nanotechnology (AIBN) and the Queensland advanced materials processing and manufacturing (AMPAM) centre at UQ.