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Australian–European Self-Assembly through Macromolecular Interactions II

Sébastien Perrier and Franck D'Agosto

We are very excited to bring you in this special issue strictly selected highlights from the highly successful and friendly 2nd Australian–European workshop held in Lyon, France, during the EPF conference in July 2017. The first edition of this series was published in 2016 in *Macromolecular Chemistry and Physics*,^[1] and followed the 1st Australian–European workshop hosted by the 2015 European Polymer Federation (EPF) conference in Dresden, Germany. The present issue of *Macromolecular Rapid Communications* includes fifteen contributions from Australian and European teams and focuses on two major aspects of polymer science: polymer chemistry and polymers for bio-applications. This gives a flavor of the diversity and excellence of the scientific research performed in groups across Europe and Australia, and the potential of collaboration and scientific opportunities between the two continents.

The topic of polymer chemistry is covered over one review and ten papers. Simon Harrisson (Toulouse, France) gives a very nice perspective on the design and synthesis of asymmetric copolymers, polymers in which the distribution of monomers is neither strictly segregated nor uniformly mixed, with useful applications (DOI: 10.1002/marc.201800357). Franck D'Agosto's team (Lyon, France) explores the design of new telechelic polyethylenes carrying phosphonic acid end groups (DOI: 10.1002/marc.201800154). By taking advantage of the control over macromolecule composition and architecture available with precision polymerization techniques, Markus Müllner (University of Sydney, Australia) and colleagues have a closer look at the original self-assembly of diblock copolymers brushes increasingly confined in nano-emulsion droplets during the evaporation of the solvent (DOI: 10.1002/marc.201800177). Johan Heuts and his team (TUE,

the Netherlands) nicely explain how poly(butylene terephthalate) (PBT) can be turned into vitrimers and simultaneously be processed like neat PBT via the use of Zn(II) as transesterification catalyst and protected pentaerythriol as crosslinker (DOI: 10.1002/marc.201800356). Through an original TEMPO-mediated route, Leonie Barner and coworkers (QUT, Australia) propose alternative strategies to the design of functionalized and crosslinked microparticles using thiol-ene chemistry. Thiol or ene moieties remaining at the surface of the particles were still reactive for further surface functionalization chemistry with complementary ene- or thiol-containing compounds, respectively (DOI: 10.1002/marc.201800169). Much smaller particles (sub-100 nm) were obtained by using sterically large, hydrophilic glycomonomers such as a lactose acrylamide by Sébastien Perrier and his team (University of Warwick, England) by a one-step, free radical and surfactant-free emulsion polymerization (DOI: 10.1002/marc.201800122). Greg Qiao and coworkers (University of Melbourne, Australia) propose an alternative Fenton-RAFT procedure to finely control the radical production via automation. Radical wasting reactions are disfavored, and the chain end fidelity of the macromolecules produced by RAFT improved (DOI: 10.1002/marc.201800179). Daniel Keddie's team (University of Wolverhampton, England) examines a powerful method to get rid of sulfur in RAFT-synthesized polymers prepared with so-called *N*-methyl-*N*-pyridylthiocarbamates switchable RAFT agents by thermolysis at temperatures that preserve the integrity of the main chain (DOI: 10.1002/marc.201800228). Michelle Coote, Pu Xiao (University of Canberra, Australia) and coworkers report the use of multihydroxy-anthraquinone derivatives as versatile photoinitiators for various types of photopolymerization reactions, including cationic photopolymerization of epoxides and divinylethers, or RAFT polymerization of methacrylates under green LED light (DOI: 10.1002/marc.201800172). Graeme Moad and colleagues (CSIRO, Australia) provide the first report on visible-light-initiated single unit monomer insertion (SUMI) into RAFT agent in aqueous solution and demonstrate the higher specificity for SUMI over formation of higher oligomers and/or RAFT-agent-derived byproducts for longer irradiation wavelengths. Finally, with the help of kinetic Monte Carlo simulations, Catherine Lefay and colleagues (Marseille, France) correlate the homogeneity in degradation of copolymers prepared by copolymerization of vinyl monomers and cyclic ketene acetals with the reactivity ratios of the comonomer pair (DOI: 10.1002/marc.201800193).

This issue also expands from polymer chemistry to polymers targeting bio-applications, illustrating the wide-ranging scope of Australian and European collaborative research. Paul Wilson (University of Warwick, England) and Tom Davis

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(Monash University, Australia) offer a review on arsenic and derivatives, and their applications in the field of polymer and biomaterials science as a platform for functional biomaterials (DOI: 10.1002/marc.201800205). Prieto Simon and Nicolas Voelcker (Monash University, Australia) show in a collaborative work with Holger Schönherr (Universität Siegen, Germany) how to functionalize original porous silicones films with a methacrylate-containing hyaluronic acid for new sensor applications (DOI: 10.1002/marc.201800178). Maria Vicent and her team (Valencia, Spain) report the development of a series of polyacetal-based conjugates incorporating curcumin and diethylstilbestrol for prostate cancer treatment. These two drugs can then be smoothly released under conditions similar to the tumor microenvironment, endosomes, or lysosomes (DOI: 10.1002/marc.201800265). Sébastien Perrier (University of Warwick, England) and Neil Cameron (Monash University, Australia) present their collaborative work on the use of cyclic peptide-polymer conjugates (CPPC) to engineer channels for the transport of protons across lipid membranes (DOI: 10.1002/marc.201700831).

All these works highlight the excellence of the research performed on both continents and illustrate many active and fruitful collaborations. We hope you will enjoy the reading.



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[1] *Macromol. Chem. Phys.* **2016**, 217, 2207.