



Symposium SM8: Advanced Polymers

Research in the field of polymeric materials is often motivated by complex demands of modern applications. Polymeric materials offer various structural parameters on different levels to adjust their properties and functions: the chemical structure of the repeating units, their chain segment length in polymer network architectures, and the (self-)assembly of macromolecules on the supramolecular level.

Multifunctional materials can be designed as hybrid structures (e.g. (nano)composites, block copolymers, blends, protein-polymer hybrids, fibrillar or multilayer constructs), in which distinct phases separately or synergistically contribute to the overall performance. These hybrid structures can be further enhanced by the possibility of an hierarchical organization of the structural constituents at various length scales ranging from the molecular to nano-, micro- or even the macro lengthscale, by employing modern processing techniques such as 3D-printing.

Multifunctionality of materials may be realized through a biological inspiration of their structure and interactions; or through the presence of natural or biologically active components, e.g. in biobased polymers (such as programmable DNA nanostructures); or via a complex but controlled physical behavior, e.g. actively moving polymers (shape-memory effect, shape-changing capability).

Additional functions span through electrical/thermal conductivity, REDOX behavior, (bio)sensing, temperature-dependent behavior, bio-compatibility and/or degradability, bioresponsive drug delivery and self-healing capability.

Topics will include:

- Functional nanocomposites / multimaterial systems
- Stimuli-sensitive gels / biomimetic approaches for creating functions (including self-assembly)
- Shape-memory polymers / shape-changing polymers
- Functional nano/microobjects
- Biodegradable polymers / biobased materials
- Stimuli-sensitive composites in inorganic/polymeric materials for molecular/cellular sensing, manipulation, stimulation and analysis

Joint sessions are being considered with **NM10 - Micro/Nano Assembling, Manufacturing and Manipulation for Biomolecular and Cellular Applications.**

Invited speakers include:

Paolo Falcaro	Graz University of Technology, Austria	André R. Studart	ETH Zurich, Switzerland
Donglei (Emma) Fan	University of Texas at Austin, USA	Brent S. Sumerlin	University of Florida, USA
Sarah C. Heilshorn	Stanford University, USA	Nicola Tirelli	University of Manchester, United Kingdom
David Safranski	MedShape, Inc., USA	Ulrich Wiesner	Cornell University, USA
Stefan Seeger	University of Zurich, Switzerland	Ryo Yoshida	University of Tokyo, Japan
Herbert Shea	École polytechnique fédérale de Lausanne, Switzerland		

Symposium Organizers

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