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CLUSTER OF EXCELLENCE PROGRAMMABLE MATERIALS

V1_Dec21

International Conference on Programmable Materials

Hybrid Event, 12-14 July 2022, Berlin

Symposium: Shape Memory Polymers & Programmable Property Profiles
Chairs: Thorsten Pretsch, Jean-Marie Raquez, Weimin Huang
Contact: thorsten.pretsch@iap.fraunhofer.de

The vision of programmable materials is to integrate an "on-demand" function directly into a material. This would allow programmable materials to adapt to any changing environmental conditions in a predetermined manner. Shape memory polymers belong to this emerging class as programmable materials. According to the traditional one-way programming approach, a shape memory polymer is thermomechanically treated to temporarily fix an imposed shape and allow shape recovery after the application of an external stimulus such as heat. The recent approach of programmable materials goes a step further by focusing on programming two-way effects into the same shape memory polymers. This allows realizing thermoreversible actuation, without the need to reprogram a material after a single switching event. These programmed shape memory polymers have a "built-in" IF/THEN/ELSE switching function, i.e. only IF a specific stimulus suitable for initiating a switching process is applied, THEN a change in shape takes place, otherwise (ELSE) no shape change occurs. The advantageous material behavior can be repeatedly detected by simply changing environmental conditions such as heating or cooling without any additional external control. Manufacturing methods, so called 4D-printing, are being employed to produce polymers with shape memory effect. This has enabled significant developments to be made which can help to promote the use of these materials in new applications.

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Our symposium focuses on recent progress in the synthesis, processing and additive manufacturing of shape memory polymers and the development of programming routes for one-way and in particular for two-way shape memory effects. The latter are a basic prerequisite for giving components new programmable property profiles that can add significant value in a wide range of applications.

The symposium provides an interdisciplinary platform for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges and solutions adopted in the field of shape memory polymers. Results from basic research and application-oriented development will be presented. Lectures or posters with a half-page abstract can be submitted and will be evaluated in a scientific selection process.

Why attend?

- Top-class plenary talks
- Five symposia in three parallel sessions with invited talks on the following topics:
  - Mechanical Metamaterials & Structural and Functional Optimization
  - Polymers with sequence control
  - Shape Memory Polymers & Programmable Property Profiles
  - Design Ideas from nature
  - Living Materials Systems
- Live and virtual poster presentations
- Panel discussions
- Conference Dinner

Registration and the call for poster presentations will start soon, we will keep you informed.

For further information please check our webpage at www.progmatcon.com

Conference Chairs:

- Prof. Dr. Peter Gumbsch, Fraunhofer IWM
- Prof. Dr. Alexander Böker, Fraunhofer IAP
- Prof. Dr. Chris Eberl, Fraunhofer IWM

Conference Organization: Fraunhofer Cluster of Excellence Programmable Materials, www.cpm.fraunhofer.de

Contact: Wiebke Beckmann, wiebke.beckmann@iwm.fraunhofer.de