

MM 34: HV Lendlein

Time: Thursday 14:00–14:30

Location: H16

Invited Talk

MM 34.1 Thu 14:00 H16

Shape-Memory Polymers — •ANDREAS LENDLEIN — Institute of Polymer Research, GKSS, Kantstraße 55, 14513 Teltow-Seehof

The ability of polymers to move actively in response to an external stimulus such as heat, light or magnetic field is of high scientific and technological significance. The shape-memory effect as an example for such a functionality will be presented. Upon exposure to an external stimulus, shape-memory polymers have the capability to change their shape in a predefined way. This effect results from the polymer's molecular architecture in combination with a certain processing and programming technology.

Temperature-induced shape-memory polymers are introduced and potential biomedical applications will be described. As light-induced

shape-memory polymers are independent of any external heating and do not heat up while irradiated, they especially offer an alternative mode of actuation for medical applications. Moreover, non-contact triggering of shape changes in polymers has been realized by incorporating magnetic nanoparticles in thermally-induced shape-memory polymers. These compounds are heated inductively if they are submitted to alternating magnetic fields.

Each biomedical application is demanding a specific set of macroscopic properties and functionalities (such as degradability). A concept allowing tailoring of properties by varying the molecular parameters and functionalization are polymer systems. The innovation potential of such families of polymers is illustrated for a multifunctionalized material system.