Werkstoffwissenschaftliches Kolloquium SS18

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Stimuli-responsive Polymer-Based Biomaterials for Biomedical Applications

Stimuli-responsive instructive biomaterials are particularly attractive for the treatment of a variety of conditions either via the controlled delivery of precise quantities of drugs at specific locations and times, or indeed delivery of a cue (e.g. chemical, electrical, light, mechanical, topographical) to the cells interacting with the material (e.g. in the form of a medical device or tissue scaffold).

Materials responding to stimuli such as enzymes, light, pH, temperature, ultrasound and electric/magnetic fields have been developed for use as drug delivery devices, medical devices and tissue scaffolds. An interesting research area is the development of materials capable of controlling either cell behaviour or the delivery of drugs in response to electricity, light and magnetism.

Here we report the development of electroactive polymers that have tuneable properties which makes them attractive components of electroactive biomaterials that when non-degradable have potential application for long term medical devices (e.g. bioactive coatings, electrodes, tools), and when degradable have potential application for short term applications (e.g. drug delivery or tissue engineering). An overview of these developments will be presented.

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