

Hydrogel Sensors And Actuators Engineering And Technology

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Hydrogel Sensors And Actuators Engineering

The ability to perform mechanical work has been shifted the technical interest more and more towards sensors and actuators exploiting the thermo-chemo-mechano-electrical coupling within hydrogels. The accuracy requirements for such devices are much more demanding than for previous applications.

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Hydrogel Sensors and Actuators: Engineering and Technology ...

Hydrogels are a fascinating class of polymers which show an immense ability of swelling under the influence of temperature, pH value or concentrations of different species in aqueous solutions. The volume change can amount up to several hundred percent. This unique behaviour is already used in...

Hydrogel Sensors and Actuators: Engineering and Technology ...

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Hydrogel Sensors and Actuators | SpringerLink

Hydrogels (biocompatible, biodegradable materials that are used in designing soft robots and sensor integration), have come into demand because of their beneficial properties, such as high water content, flexibility, and multi-faceted advantages particularly in targeted drug delivery, surgery and biorobotics.

Hydrogel Actuators and Sensors for Biomedical Soft Robots ...

Recently, “smart” hydrogels with either shape memory behavior or reversible actuation have received particular attention and have been further developed into sensors, actuators, or artificial muscles. These three-dimensional polymer networks with the capability of shape deformations show a volume phase trans

Trends in polymeric shape memory hydrogels and hydrogel ...

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To enable specific functions of hydrogel machines, hydrogels have been designed to possess specific properties, for instance, stimuli-sensitivity for hydrogel sensors and actuators, strong adhesion for hydrogel coatings, optical transmission for hydrogel optics, electrical conduction for hydrogel electronics, and water absorption/release for hydrogel water harvesters, as summarized in above sections.

Hydrogel machines - ScienceDirect

The integration of magnetic particles inside hydrogel matrices enables the hydrogels to respond and actuate according to the steering of the magnetic field in a tunable and wireless manner,...

Bioactuators based on stimulus-responsive hydrogels and ...

An excellent and detailed overview of stimulus-sensitive

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hydrogels used in sensor and actuators has been published by van der Linden et al. in 2003 . In 2010, the use of hydrogels in photonic crystal sensors has been reviewed in detail by Nair and Vijaya . Hence, this chapter will briefly introduce the underlying mechanisms that build the basis for sensing and subsequently focus on the advances achieved in the last decade.

Hydrogels in sensing applications - ScienceDirect

Hydrogel Sensors and Actuators. First book worldwide which focuses on polymer hydrogels applicable for electron devices in microsystem technology, sensor technology and precision engineering. Describes the state-of-the-art of this technology.

Hydrogel Sensors and Actuators

Hydrogels are formed from hydrophilic polymer chains surrounded by a water-rich environment. They have widespread applications in various fields such as biomedicine, soft

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electronics, sensors, and...

Advances in engineering hydrogels | Science

The current hydrogel actuator exhibits controlled motion velocity and direction, making it promising for a wide range of mobile robotics, soft robotics, sensors, controlled drug delivery and other...

In-air fast response and high speed jumping and rolling of ...

Hydrogels are also used as actuators in the context of microfluidics. 31 - 33 Multisensitive swelling for actuatoric purposes is demonstrated, e.g., by refs. 34 - 36, where hydrogel valves are used as chemostats in microfluidic information processing. Also, multisensitive core-shell microgels for drug delivery can be seen as actuators. 37 - 40

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Multisensitive Swelling of Hydrogels for Sensor and ...

Herein, two approaches to the modeling of multisensitive sensors and actuators are proposed: the N -field method and the trajectory method. They are derived using experimental data of the bisensitive hydrogel [net -P (AMPS- co -NiPAAm)]- sign -PAMPS. It is sensitive to sodium salt concentration and temperature.

Multisensitive Swelling of Hydrogels for Sensor and ...

Abstract We report multi-responsive and double-folding bilayer hydrogel sheet actuators, whose directional bending response is tuned by modulating the solvent quality and temperature and where locally crosslinked regions, induced by ionoprinting, enable the actuators to invert their bending axis.

Ionoprinted Multi-Responsive Hydrogel Actuators

Hydrogel Sensors and Actuators ; Engineering and Technology.

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[Gerald Gerlach; Karl-Friedrich Arndt] -- Hydrogels are a fascinating class of polymers which show an immense ability of swelling under the influence of temperature, pH value or concentrations of different species in aqueous solutions.

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