Extremely Compliant yet Tough Hydrogel Systems as Ultrasound Transmission Agents
Technology #17559

Applications

• Ultrasound transmission agent

Problem Addressed

Typically liquid gel is used in ultrasound procedures to improve the transmission of the ultrasound signals from the transducer to the body. However, conventional liquid hydrogels dry quickly or drip off the patient's skin quickly. This new compliant and tough hydrogel conforms to the contours of the human body and remains effective for at least 30 minutes.

Technology

Resilience and toughness are intrinsically contradictory properties for a material -- high resilience requires low mechanical dissipation while high toughness requires high mechanical dissipation when undergoing material deformation. This invention pertains to a new innovative method and material system to design both extremely tough and resilient hydrogels. The extraordinary properties of the new hydrogels are achieved through the mechanism of delayed stiffening and mechanical dissipation. The hydrogels can be formed and printed into various shapes with different dimensions. One particular application of the new gel system is as ultrasound transmission agents. This extremely soft and tough hydrogel can conform to varying contours of both the human body and the ultrasound probe.

Advantages

• Low shear modulus, can be conformably attached to different regions of human body and wrap ultrasound probes of complex shapes
• Extremely robust
• Produces high quality ultrasound images comparable to that of conventional liquid hydrogels without dripping or drying up

Related Technologies

This technology is related to case #19677-Tough hydrogel coating of diverse medical devices.

Categories For This Invention:

Life Sciences
Clinical Applications
General Hospital & Personal Use

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Publications:
Designing Extremely Resilient and Tough Hydrogels via Delayed Dissipation
Extreme Mechanics Letters
2014

External Links:
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http://web.mit.edu/zhaox/www/

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