TECHNOLOGY

Low-Temperature Aqueous Pattering of Soft Materials

OVERVIEW

Background:
A major obstacle in the development of micro-fabricated devices for biological, chemical and energy storage applications is the difficulty in integrating liquids. The root cause of this problem is the fact that aqueous solutions, suspensions and hydrogels are liquid at room temperature, yet all microfabrication processes are designed for solids. Reducing the processing temperature by at least 30°C would open countless process integration opportunities due to all the capabilities of hydrogels.

Innovation:
Researchers at the University of Maryland have developed a pair of techniques for low-temperature aqueous pattering of soft materials. The first technique a cold clean microfabrication process allows the use of ice as a structural material that could be deposited, photo-lithographically patterned, and encapsulated at micro-scale dimensions. The second technique is a similar process using a frozen stage and a 3D printer at a lower resolution. 3D printers have been used in tissue engineering to print various biomaterials. The use of a frozen stage would allow alternating layers of frozen hydrogels and water which, when thawed, could produce a vascular channel to support tissue growth using lithography of frozen hydrogels or similar structure.

APPLICATIONS

Micro-batteries
Tissue Engineering

ADVANTAGES

Integration of liquids

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Additional Information

INSTITUTION

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EXTERNAL RESOURCES

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