



## TECHNOLOGY

# Method of Encapsulating a Fluid Between a Polymer and a Substrate for Microfluidics

## OVERVIEW

### Background:

Microfluidic devices are filled with liquid using ports and tubing, since they are typically open devices. However, for closed systems the tubing is cumbersome and it needs to be closed, for example mechanically (using clamps, plugs) or with a sealant. These protrusions can interfere with the performance of the device, particularly in applications requiring flexible or compact devices. Currently drugs and other compounds are sealed within vials using a rubber cap, which allows withdrawal of fluid using a syringe needle. Such an approach can be considered for adding liquid to closed polymeric/elastomeric microfluidic devices, but there are significant issues regarding leakage, scalability, as well as durability which can all lead to failure of the microfluidic device.

### Innovation:

Researchers at the University of Maryland have developed a method to encapsulate fluid in a polymer for microfluidic applications. This method will aid in the production of microfluidic devices where fluid is encapsulated without tubes or punctures. The encapsulation technique is applicable when the polymer forms a secure bond with the substrate material upon curing. This method can enable the creation of nastic devices, freestanding soft actuators, or fluidic displays. Soft robotics, electronic devices and biomedical devices benefit by not requiring tubing, allowing unobstructed motion and/or forming into tube shapes. These fluid-filled structures can be used in any number of biomedical devices including adjustable stents, stents with occasional motion, blood-flow regulating stents, artificial sphincters, and catheters. There are also applications in camouflage surfaces, micro-positioning, and tactile displays.

### Advantages:

- Conformal coating
- No trapped air
- Isolated containment

### Applications:

- Microfluidics
- Biomedical devices
- Nastic actuators
- Liquid based electronics
- Soft robotics

## CONTACT INFO

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## **Additional Information**

### **INSTITUTION**

University of Maryland, College Park

### **PATENT STATUS**

Pending

### **LICENSE STATUS**

Available for exclusive license

### **CATEGORIES**

- Microfluidics
- Materials

### **EXTERNAL RESOURCES**

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