

New method for simple fabrication of microperforated membranes

November 9 2010

Microscopically porous polymer membranes have numerous applications in microfluidics, where they can act as filters, masks for surface patterning, and even as components in 3D devices in which the perforations in stacked membranes are aligned to form networks of channels for the flow of fluids.

In the AIP journal *Biomicrofluidics*, Hongkai Wu, a chemist at Hong Kong University of Science and Technology, and his colleagues describe a simple new method using just one photolithographic step to fabricate free-standing polymer membranes with neatly patterned holes as small as 10 microns in diameter.

The researchers start by designing the desired pattern on a computer and printing it on a transparency (for holes larger than 20 microns in diameter) or a chrome mask (for those smaller than 20 microns). "Then," Wu says, "we place two spacers on a flat substrate and between them add a few drops of a prepolymer" -- a molecule that can form into a polymer. The prepolymer is covered with the mask, which is pressed down onto the spacers; [ultraviolet light](#) is then used to cure the membrane. The mask is then removed to reveal the free-standing, perforated membrane.

"Because our technique can fabricate membranes of [pores](#) with accurate sizes and in arbitrary shapes and sizes, and the fabrication is very easy and fast, we expect them to have many potential applications in different fields," says Wu. "These membranes can be directly used as masks to pattern inorganic, organic, and [biological materials](#) like proteins and

cells, on various surfaces," he says.

"One important application of the membrane is that it makes it very simple to fabricate 3D microfluidic structures with channels running up and down through the [membrane](#), which are difficult to make otherwise."

More information: The Article, "Fabrication of freestanding, microperforated membranes and their applications in microfluidics" by Yizhe Zheng, Wen Dai, Declan Ryan, and Hongkai Wu appears in the journal *Biomicrofluidics*. See: link.aip.org/link/biomgb/v4/i3/p036504/s1

Provided by American Institute of Physics

Citation: New method for simple fabrication of microperforated membranes (2010, November 9) retrieved 27 April 2024 from <https://phys.org/news/2010-11-method-simple-fabrication-microperforated-membranes.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.