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## Thin microfilters with tunable pores expedite blood filtration

FREE

by Avery Thompson



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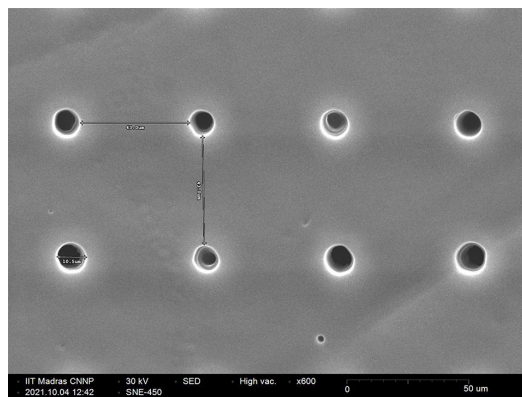


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Membranes fabricated from biocompatible polymer SU-8 are durable, effective, and simple to manufacture.



Proper filtration is essential for many fluid applications, and the filter membrane is the most important part. Blood filtration, for instance, involves either filtering out waste products or separating cells and plasma. Many microfluidic studies require filtration as well, but existing filters are bulky, require high cross-flow pressures, and are prone to clogging.

Sengupta et al. developed a thin, single-layered microfilter using SU-8, an epoxy-based negative photoresist. Their filter has a thickness of 50-60  $\mu\text{m}$  and uniform through pores of 6-10  $\mu\text{m}$  diameter. In tests, their filter could separate plasma from blood cells as well as bulk waste from fermented rice broth.

SU-8 is a biocompatible polymer often used in implantable devices due to its flexibility and high tensile strength. The authors fabricated membranes from the material using electrospin coating and UV lithography. The pore size is tunable by varying the fabrication parameters, and post-fabrication coatings can make the surface hydrophilic.

“The membrane thickness provided optimum strength and easy permeation of fluids,” said author Sudeshna Sengupta. “The membranes were intact after the filtration studies and were stable at room temperature, autoclavable, and reusable.”

The authors designed this filter for use in dialysis. They are interested in pairing their SU-8 filter with silicon nanoporous membranes, which are most effective when removing toxins from plasma, rather than whole blood.

“The SU-8 membrane has a good potential to serve as a prefilter for hemodialysis,” said Sengupta. “The design of the prefilter will next be addressed to improve the overall throughput of the dialysis.”

**Source:** “Microfabricated free standing, tuneable, porous microfilters from an epoxy based photoresist for effective bioseparation,” by Sudeshna Sengupta, D. Shyamala, Sivasundari Kannan, V. T. Fidal Kumar, and Enakshi Bhattacharya, *Biointerphases* (2024). The article can be accessed at <https://doi.org/10.1116/6.0003165>.

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