

Affordable and energy efficient silicon-based nanofiltration

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TATA CENTER
Technology + Design

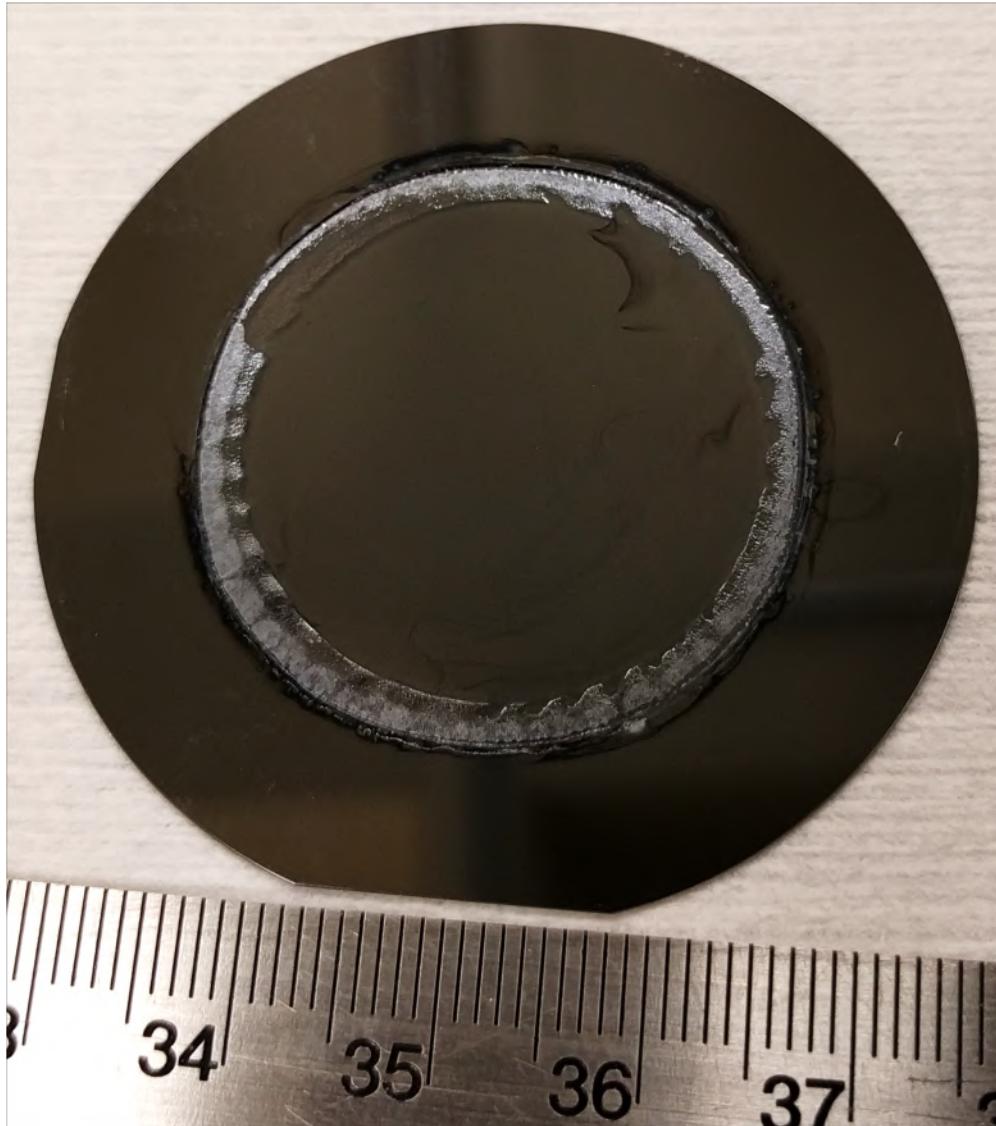
A woman in a red and orange sari stands next to a large, circular, stone-lined well in a rural, arid landscape. Several metal pots and a cow are nearby.

150 million Indians
lack access
to safe
drinking
water

Current solutions: too costly, too labor intensive

	CapEx (INR)	OpEx (INR/liter)	Upkeep required	Bacteria removal	Virus removal	Arsenic removal
Chemical treatments	100	< 1	HIGH			
Sand filter	4,500	< 1	MEDIUM			
Ceramic filtration	1,000	< 1	LOW			
Reverse osmosis filtration	30,000	< 1	HIGH			

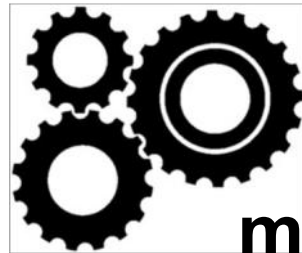
Silicon membranes offer low-maintenance performance



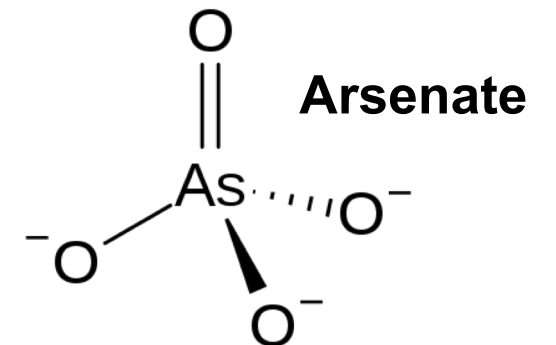
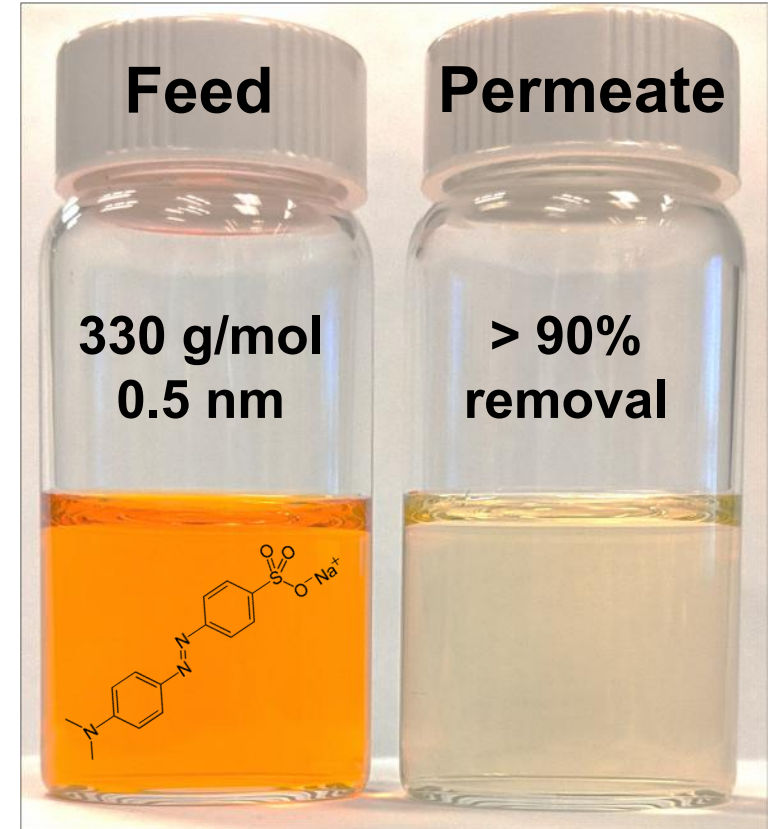
Robust



**Earth
abundant**



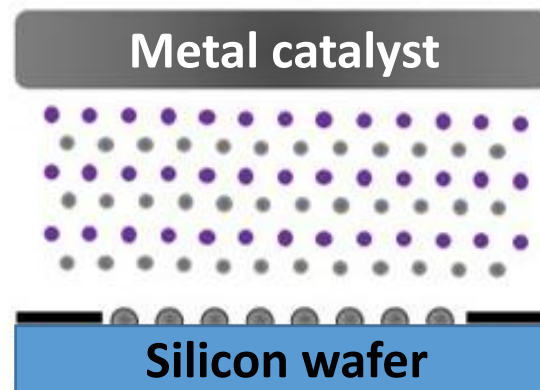
**Scalable
manufacturing**



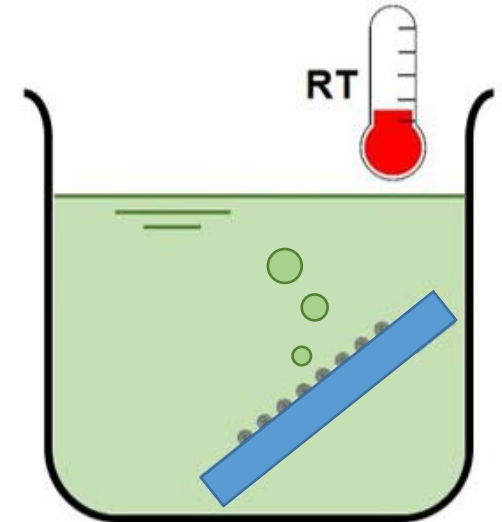
Simple, low-cost manufacturing



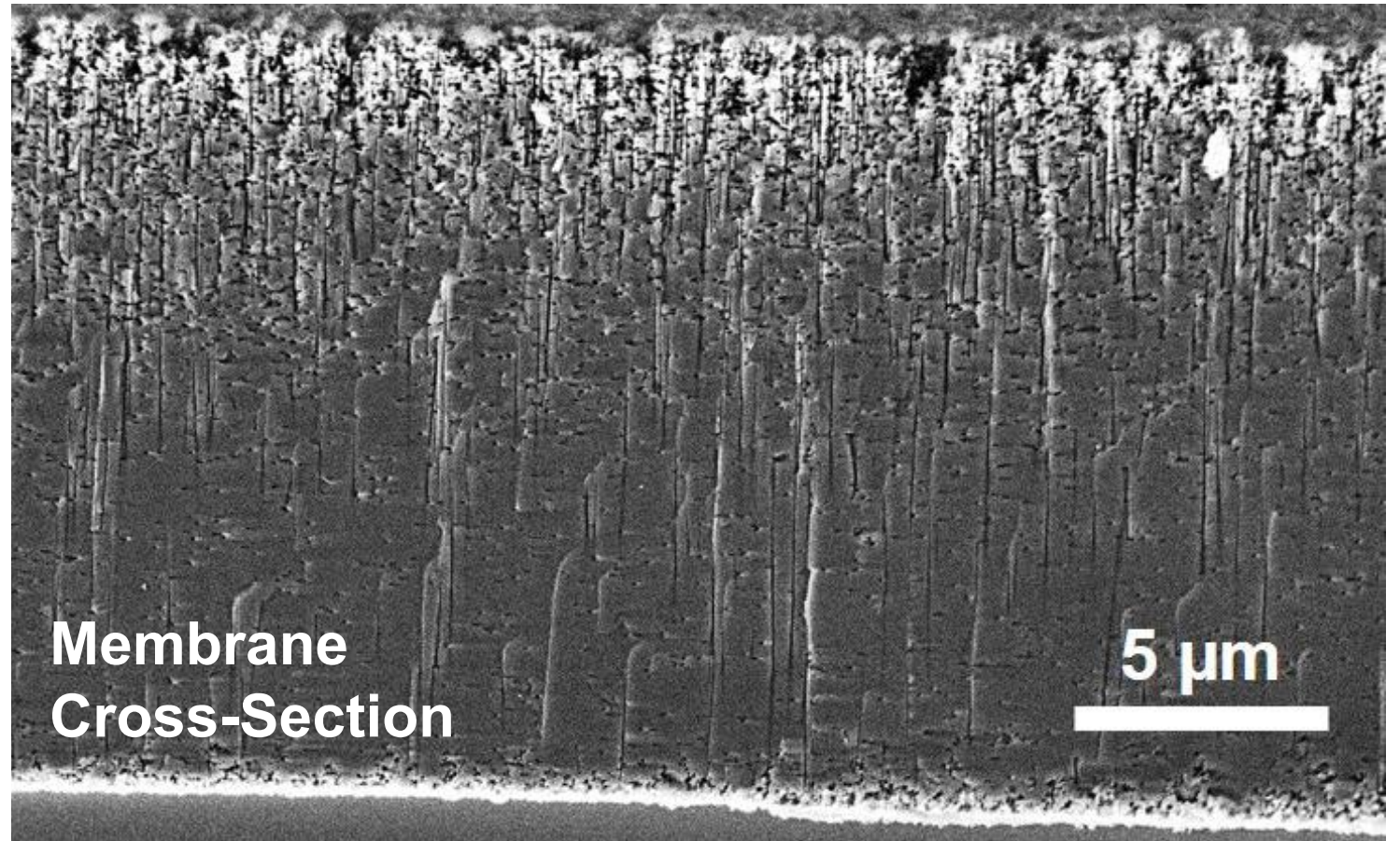
1. Catalyst deposition


















2. Chemical Etching



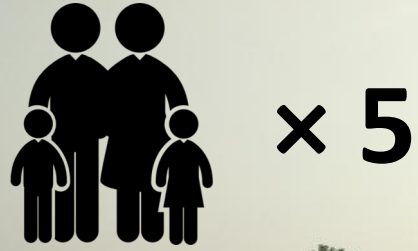
Simple, low-cost manufacturing



Improved performance for a lower price

	CapEx (INR)	OpEx (INR/liter)	Upkeep required	Bacteria removal	Virus removal	Arsenic removal
Chemical treatments	100	< 1	HIGH			
Sand filter	4,500	< 1	MEDIUM			
Ceramic filtration	1,000	< 1	LOW			
Reverse osmosis filtration	30,000	< 1	HIGH			
Silicon nanofiltration	3,000	< 1	LOW			

Household scale



Community scale



Exploring opportunities in chemical processing

Tunable molecular
separations

+

Harsh thermal & chemical
environments

Thank you!



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