

Supporting Information

A Low-Cost Biomimetic Heterostructured Multilayer Membrane with Geopolymer Microparticles for Broad-Spectrum Water Purification

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Figure S1. Filtration setup for the removal of pollutants from water by the GHMM.

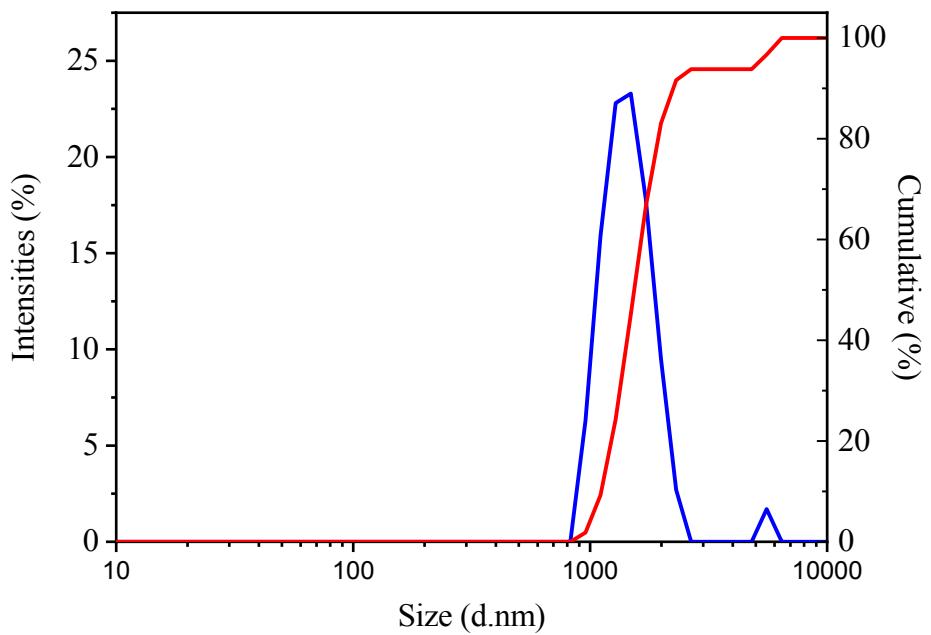


Figure S2. Size distribution of the GPs.

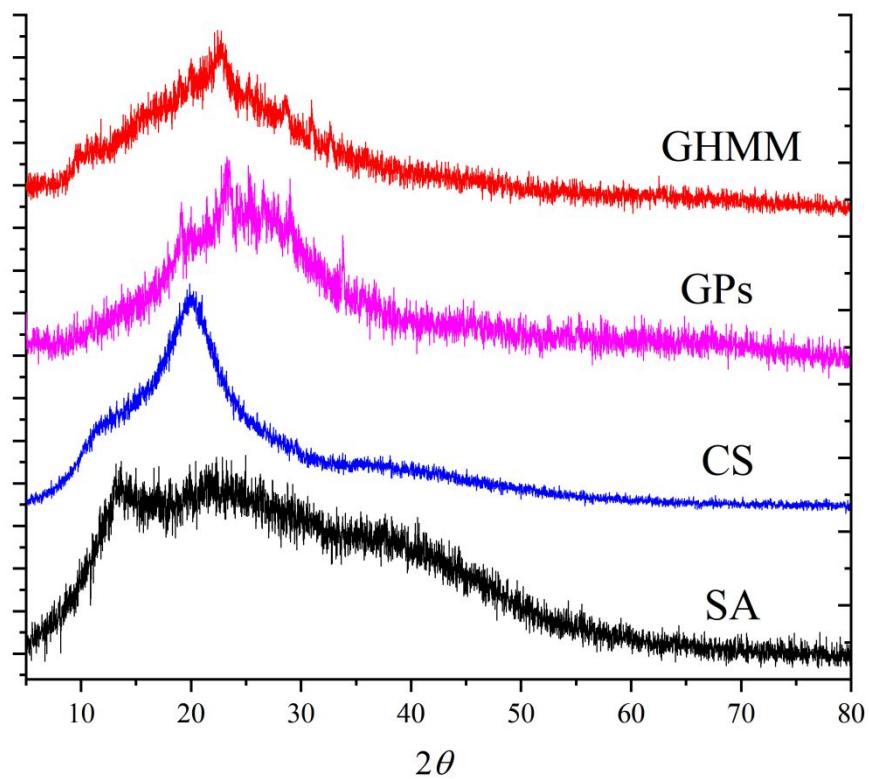


Figure S3. XRD patterns of the SA, CS, GPs and GHMM.

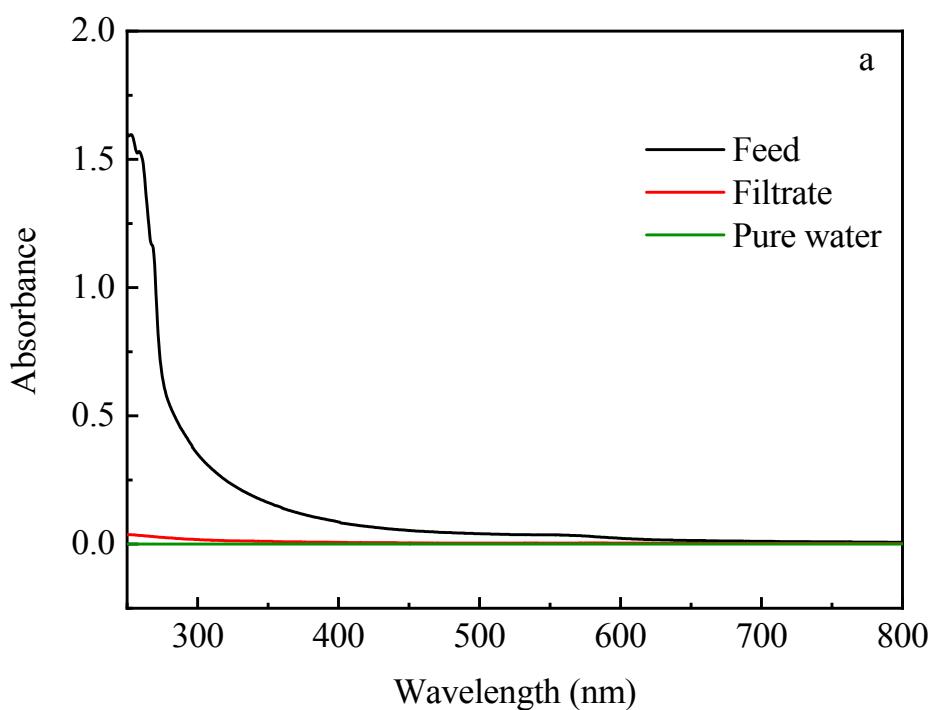


Figure S4. UV absorbance of the feed solution containing PS nanoparticles, filtrate and pure water.

Table S1. Zeta Potential of the Samples.

Samples	CS	SA	GPs
Zeta	15.7 mV	-49.1 mV	-40.5 mV

Table S2. Cost for raw materials and the required quality of raw materials for per gram GPs and one piece of GHMM.

Materials	Cost (US \$ per gram)	The required quality of raw materials for per gram GPs	The required quality of raw materials for one GHMM
Metakaolin	0.43×10^{-3}	~ 1.67 g	~ 1 g
Industrial water glass	0.29×10^{-3}	~ 2.53 g	~ 1.7 g
Sodium hydroxide	5.71×10^{-3}	~ 0.29 g	0.17 g
CS	0.11	/	0.4×10^{-3} g
SA	0.03	/	0.028 g

Table S3. Comparisons of the cost of materials and membranes.

Materials/Membrane	Cost (US \$ per gram)	Reference
GPs	3.1×10^{-3}	This work
Graphene oxide	26.5	[32]
Nano-hydroxyapatite	2.28	J&K Scientific
Nano-silver	43.1	J&K Scientific
GHMM	0.028	This work
SNF/HAP membrane	3.36	[24]
Commercial cellulose membrane (0.45 μm)	0.51	Jingteng microfiltration membrane