

Supplementary Information

Tailored Preparation of Porous Aromatic Frameworks in Confined

Environment

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Supplementary characterization

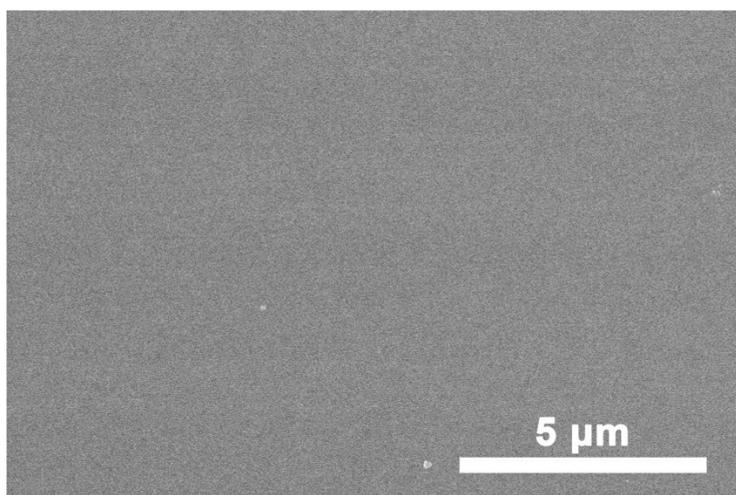


Fig. S1 SEM image of PS/PAF-1 hybrid membrane formed on silicon substrates prior to membrane transfer.

In order to verify that PAF-1 powder was successfully obtained, the structure and composition of PAF-1 powder have been characterized by FT-IR spectroscopy and solid-state ^{13}C CP/MAS NMR spectroscopy. As shown in **Fig. S2a**, the disappearance of the C-Br bonds ($\sim 1078\text{ cm}^{-1}$, $500\text{-}600\text{ cm}^{-1}$) indicates the complete conversion of TBMP. The resonance signals at 146, 140, 131, 125, and 64 ppm are resolved (**Fig. S2b**), which are consistent with the previous report.⁵ In addition, the nitrogen adsorption-desorption isotherm of PAF-1 powder was tested at 77 K which shows a classic type I isotherm according to **Fig. S2c**. The Brunauer-Emmett-Teller (BET) surface area of PAF-1 was calculated to be $4765\text{ m}^2/\text{g}$. The pore size of PAF-1 was calculated according to Density Functional Theory (DFT) which was calculated to be 1.19 nm (**Fig. S2d**).

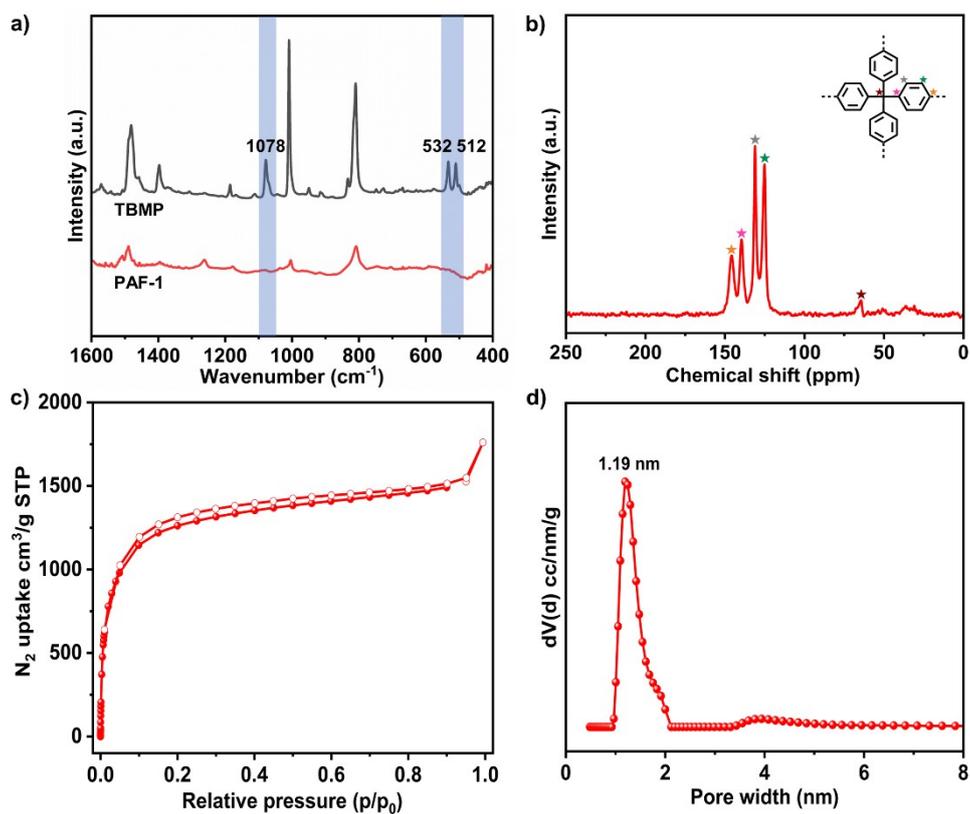


Fig. S2 a) FT-IR spectra of the TBMP (grey) and PAF-1 powder (red) from 400-1600 cm⁻¹; b) Solid-state ¹³C CP/MAS NMR spectrum of PAF-1; c) Nitrogen adsorption-desorption isotherm measured at 77 k for PAF-1; d) The pore size of PAF-1 was calculated according to Density Functional Theory (DFT).

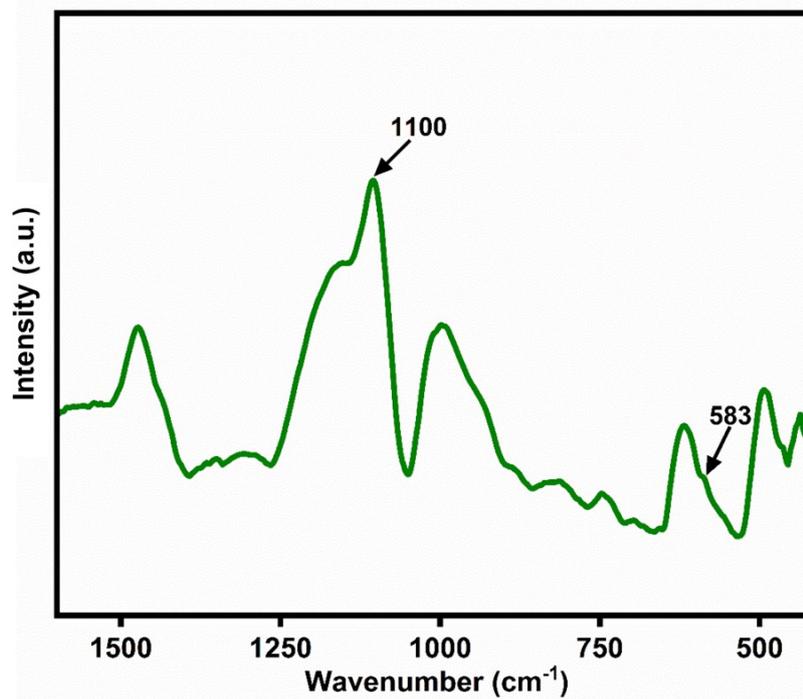


Fig. S3 FT-IR spectrum of poly(4-bromostyrene-co-styrene) brushes.

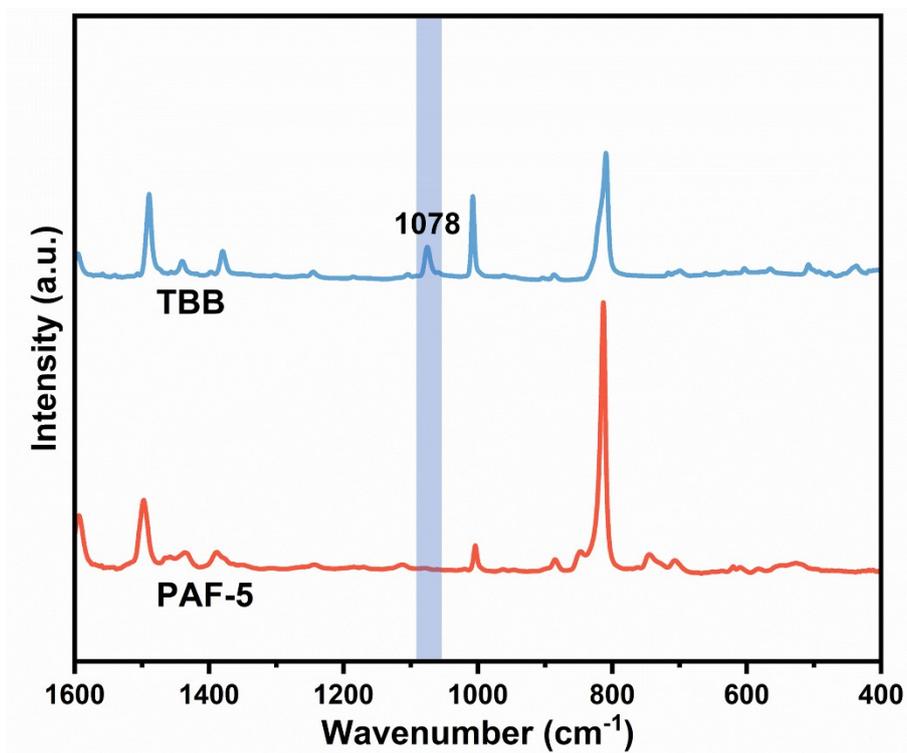


Fig. S4 FT-IR spectra of the TBB (blue) and PAF-5 powder (orange) from 400-1600 cm⁻¹.

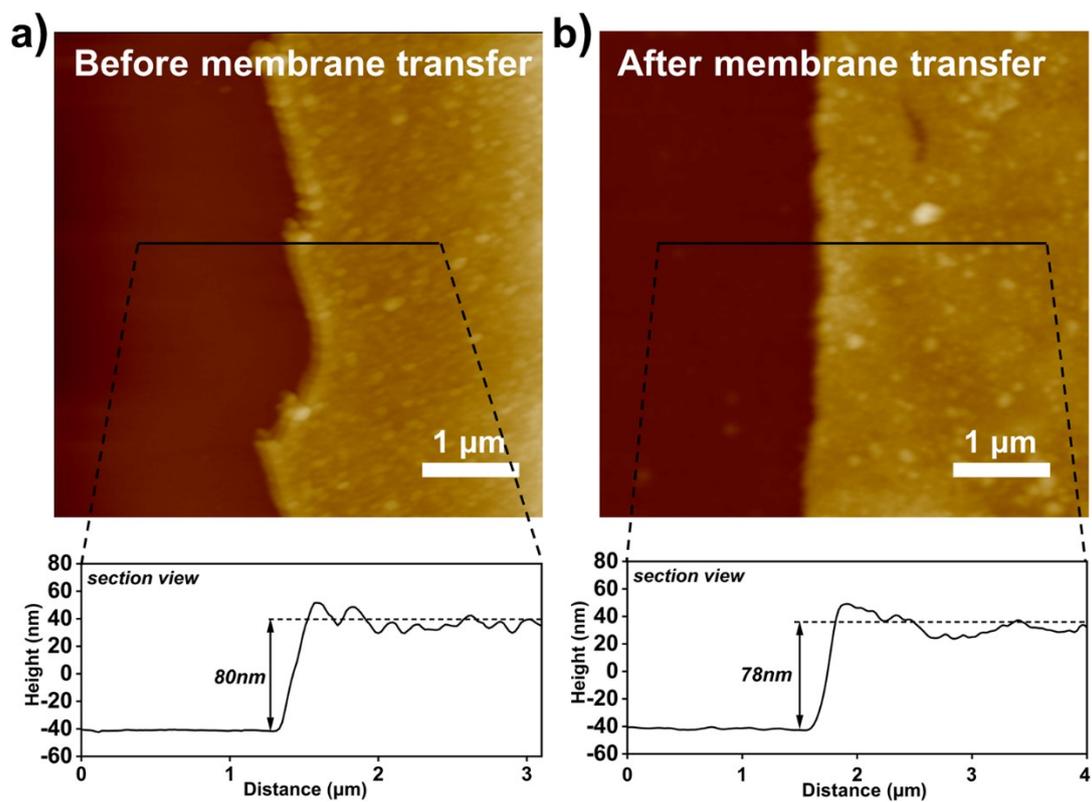


Fig. S5 AFM scans and the corresponding of section view of PS/PAF-1 hybrid membrane before a) and after b) the process of membrane transfer.

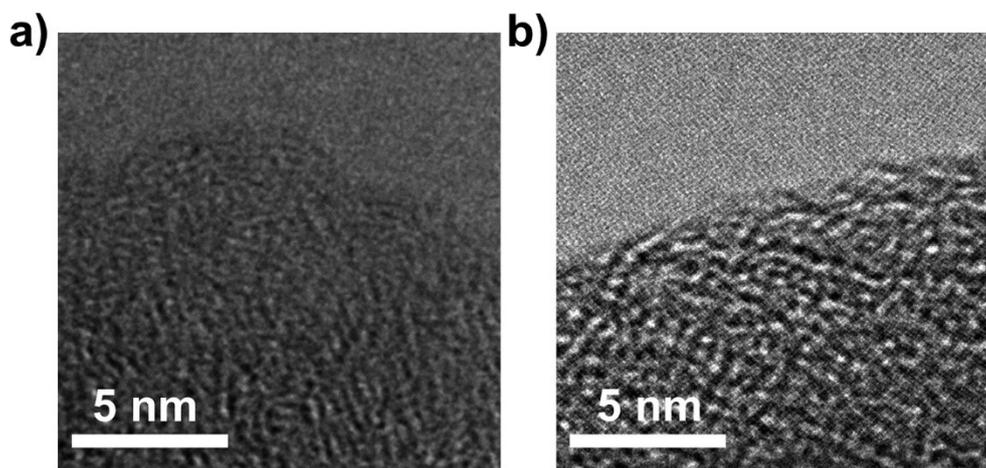


Fig. S6 HRTEM images of on the regions of a) PS and b) PAF-1 of the hybrid membrane.

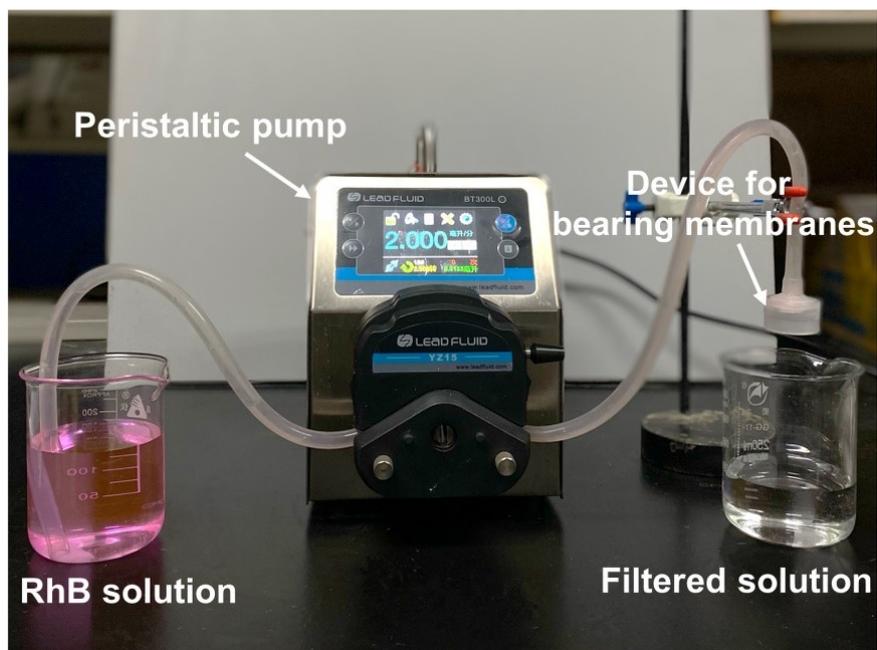


Fig. S7 Continuous flow device.

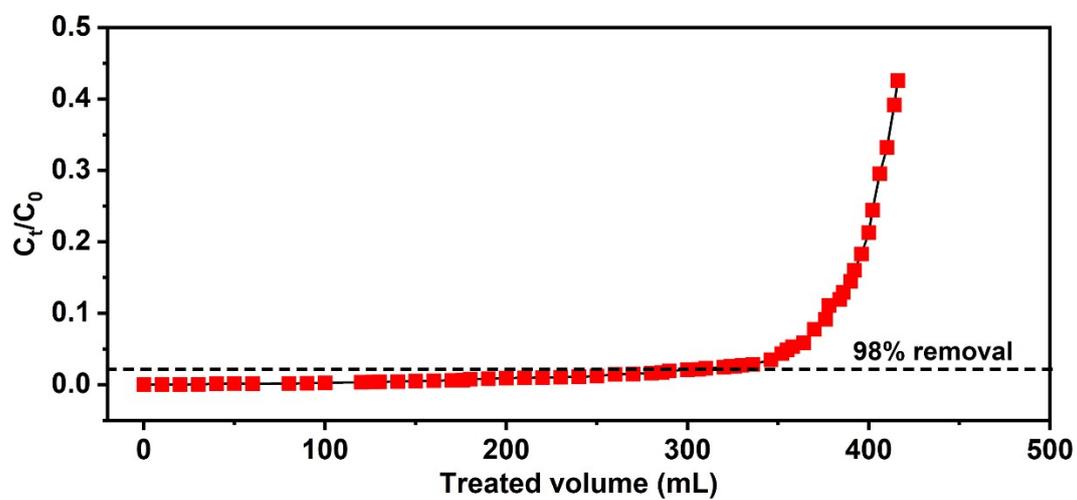


Fig. S8 Adsorption curve of PS/PAF-1 hybrid membrane.