

Supporting information

for

**Enabling Covalent Organic Framework Nanofilms for
Molecular Separation: Perforated Polymer-Assisted Transfer**

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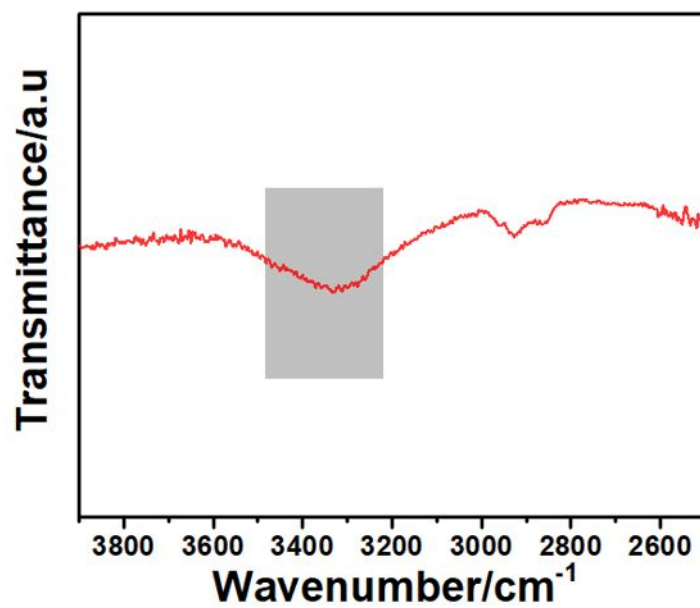


Figure S1. The FTIR spectrum of the silicon wafer.

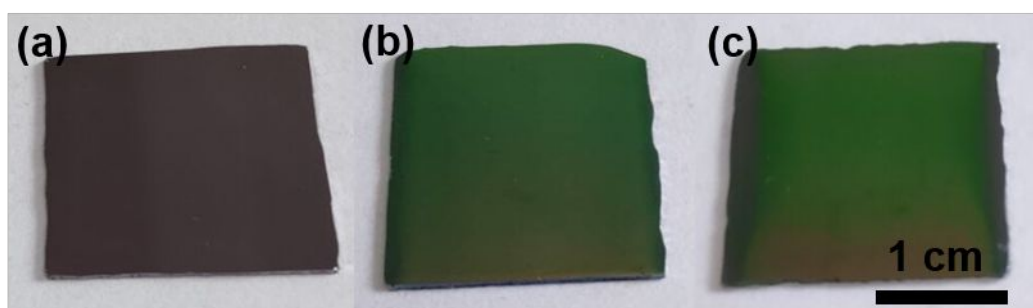


Figure S2. Photograph of the silicon wafer: (a) pristine, (b) after growth of TpPa, and (c) after growth of TpPa and spin-coating of PSF-*b*-PEG.

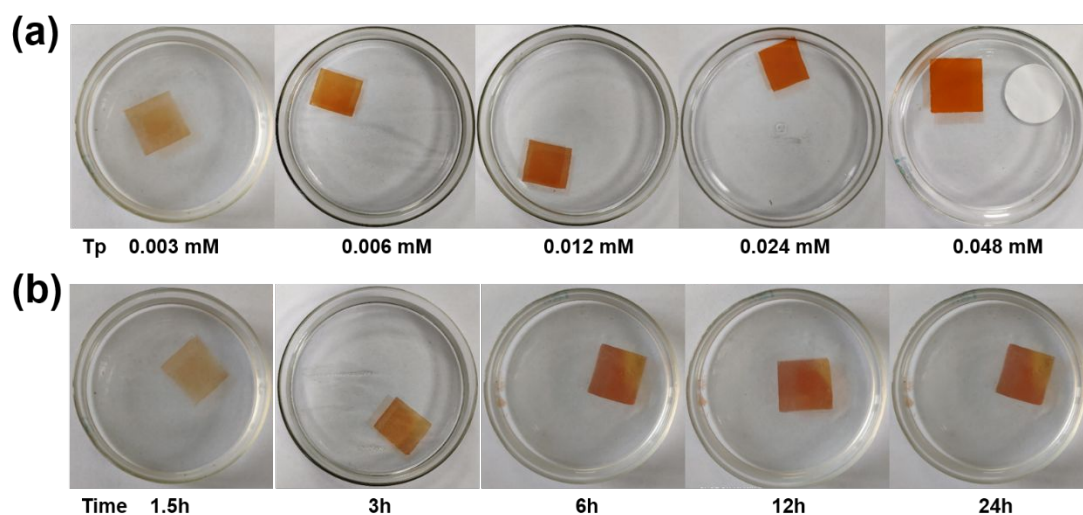


Figure S3. Photograph of TpPa nanofilms prepared with various concentrations and time. (a) Tp-dependence. (b) Time-dependence.

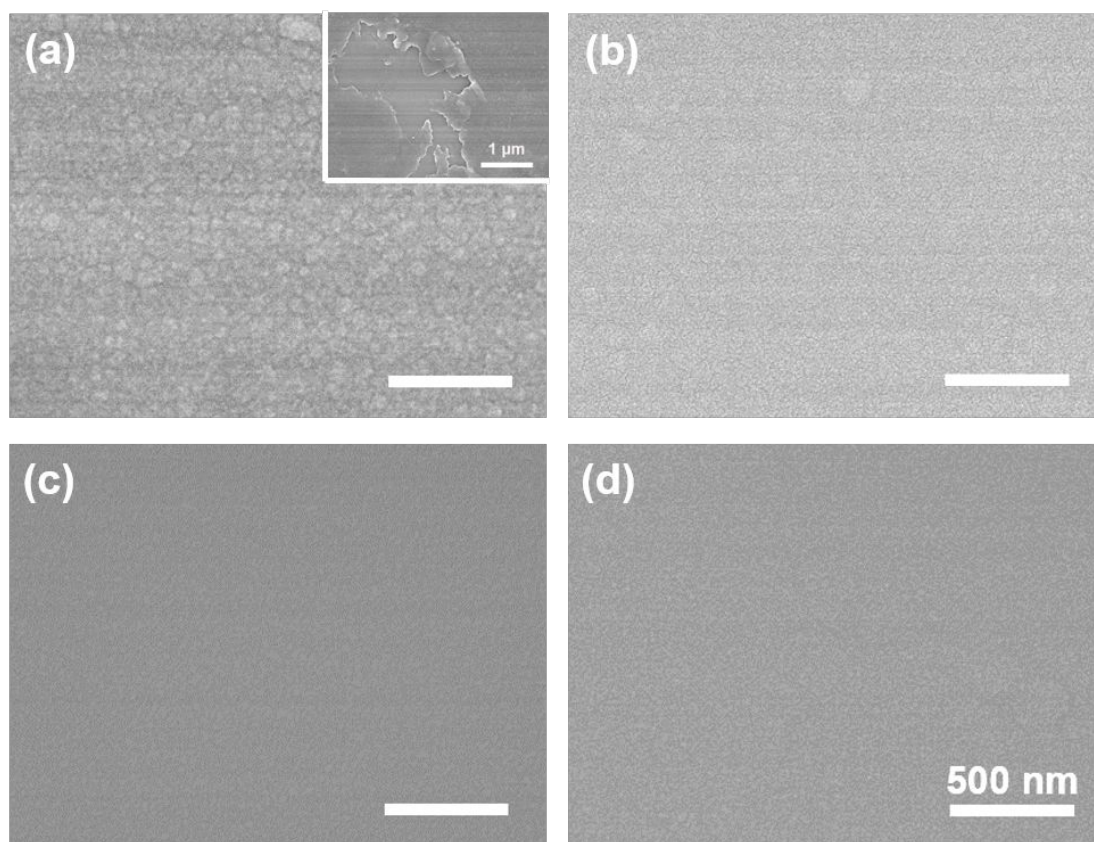


Figure S4. Surface morphologies of TpPa nanofilms generated on the silicon wafers with different reactant concentrations. Tp of (a) 0.003 mM. (b) 0.012

mM. (c) 0.024 mM. (d) 0.048 mM. All the five SEM images with the same magnification.

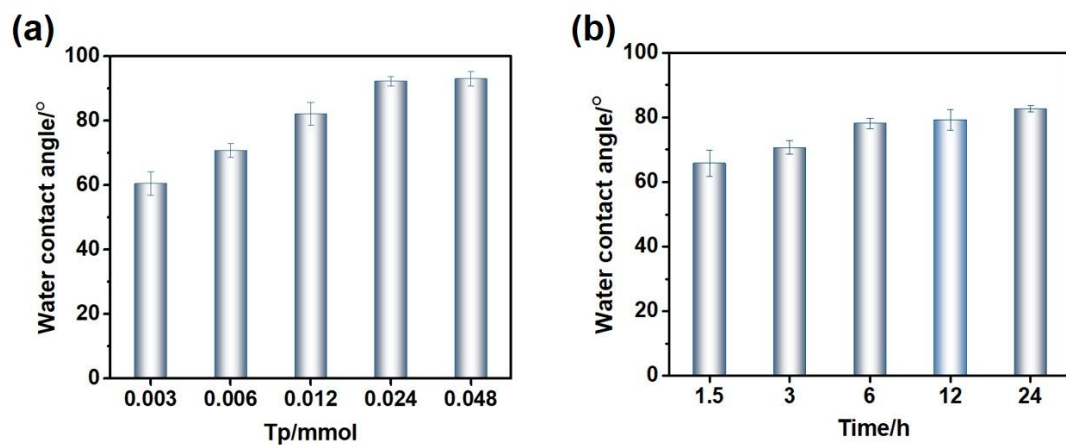


Figure S5. Water contact angles of TpPa nanofilms prepared with various concentrations and time. (a) Tp-dependence. (b) Time-dependence.

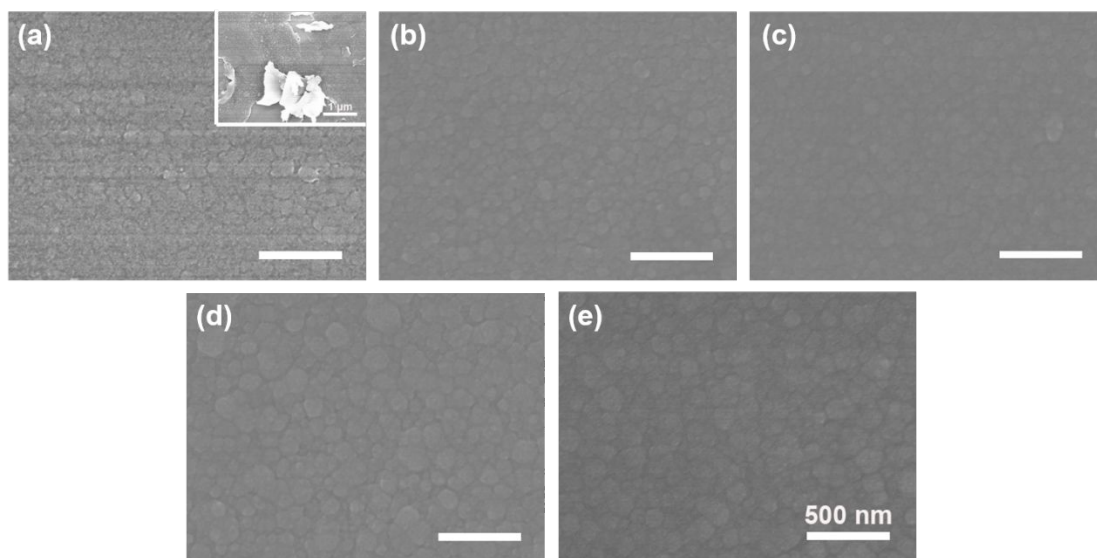


Figure S6. Surface morphologies of TpPa nanofilms generated on the silicon wafers with different time. (a) 1.5h. (b) 3h. (c) 6h. (d) 12h. (e) 24h. All the five SEM images with the same magnification.

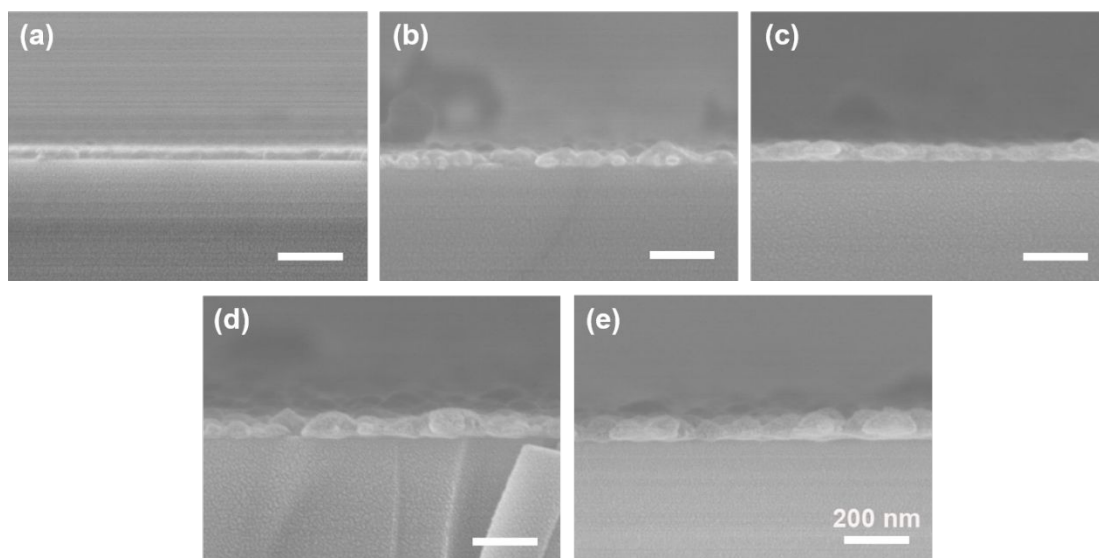


Figure S7. Cross-sectional morphologies of TpPa nanofilms generated on the silicon wafers with different time. (a) 1.5h. (b) 3h. (c) 6h. (d) 12h. (e) 24h. All the five SEM images with the same magnification.

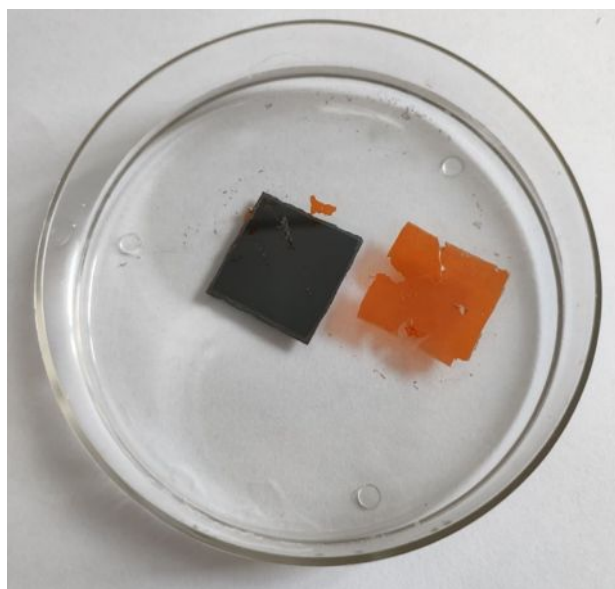


Figure S8. Photographs of the transferred TpPa nanofilm prepared with 0.048 mM Tp and 24 h without PSF-*b*-PEG layer from the silicon wafer.

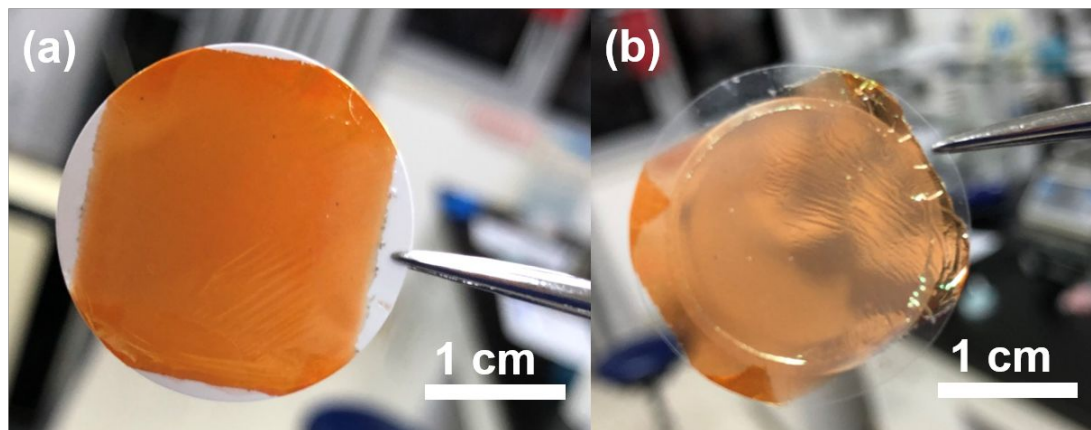


Figure S9. The TpPa nanofilm transferred onto the (a) PES and (b) AAO substrate.

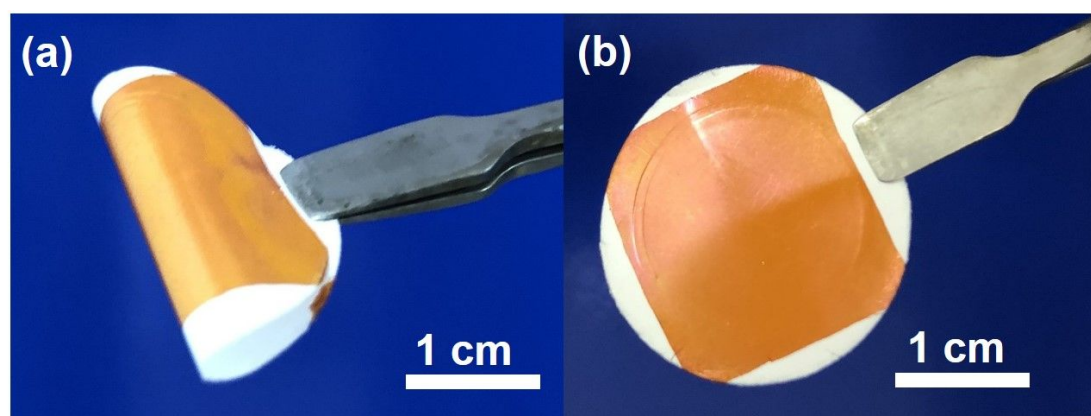


Figure S10. The TpPa composite membrane after filtration. (a) The bended membrane and (b) the unfold membrane.

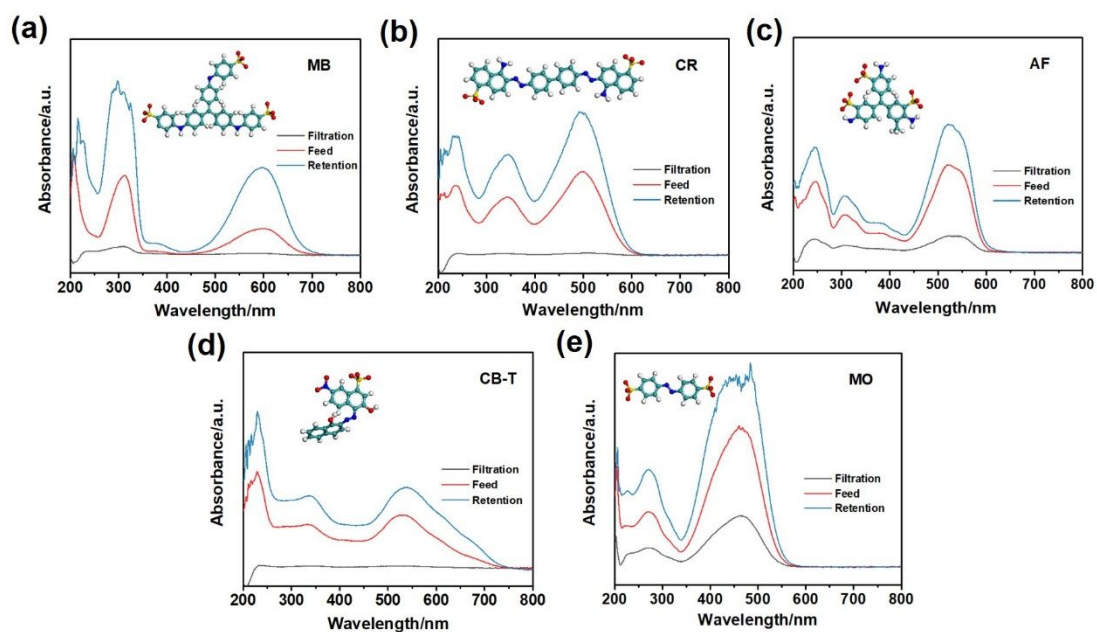


Figure S11. UV-Vis spectrum of the filtrate, feed and retentate. (a) MB. (b) CR. (c) AF. (d) CB-T. (e) MO.

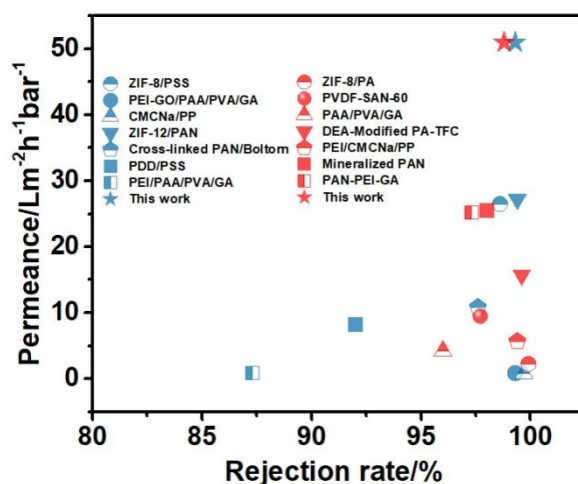


Figure S12. Separation performance comparison of the prepared TpPa composite membrane with other membranes (blue and red symbols represent rejection rates to MB and CR, respectively).¹⁻¹³

Table S1. Dye molecules with various properties.¹⁴

Dye	Mw/Da	Charge	Molecule dimension
MO	327	-	1.13 nm×0.42 nm
CB-T	461.38	-	1.55 nm×0.88 nm
AF	585.54	-	1.13 nm×1.17 nm
CR	696.68	-	2.56 nm×0.73 nm
MB	799.8	-	2.36 nm×1.74 nm

References

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