

Supplementary Material: Stability of Monolithic MOF Thin Films in Acidic and Alkaline Aqueous Media

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Note: The substrates used in this work were Au-coated silicon wafers with a 1 mm thickness (100 nm Au thickness on the surface). These substrates were then treated as specified in the experimental section. For the immersion experiments, the samples were then cut into 1 cm × 1 cm pieces.

1. Infrared reflection absorption spectroscopy (IRRAS) Spectra of as-synthesized Surface-Anchored Metal-Organic Framework (SURMOF) samples

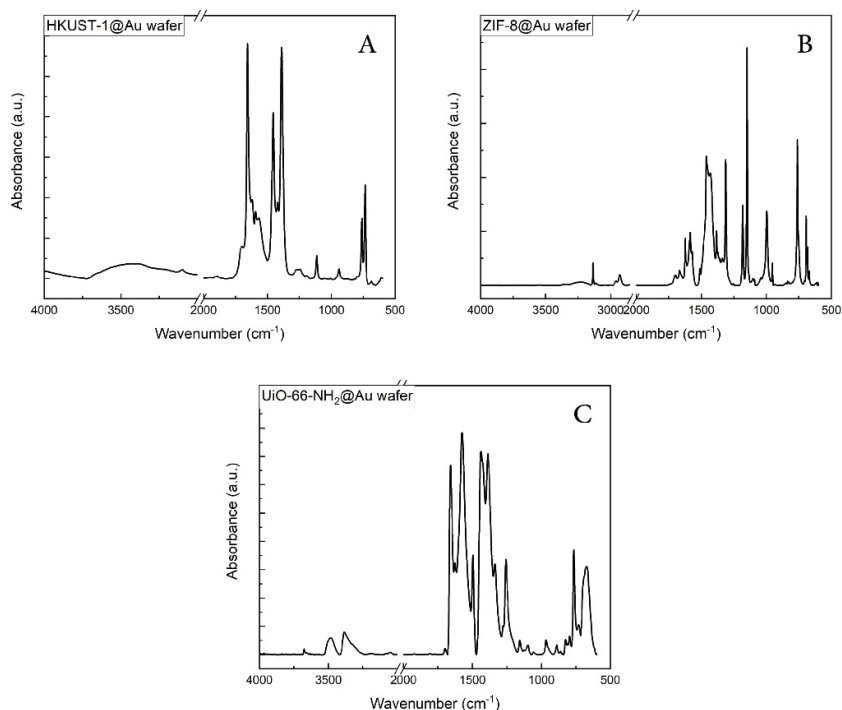


Figure S1. IRRAS spectra of as-synthesized (A) HKUST-1, (B) ZIF-8, and (C) UiO-66-NH₂ SURMOF films.

Table S1. (A) HKUST-1 SURMOF; (B) ZIF-8 SURMOF; (C) UiO-66-NH₂ SURMOF peak assign.

(A)



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Wavenumber (cm ⁻¹)	F. group	References
1656 and 1385	COO ⁻ groups bound to metal ions	Phys. Chem. Chem. Phys., 2010, 12, 8092–8097 [1] ACS Appl. Mater. Interfaces 2017, 9, 7259–7264 [2]

1455	Symmetric stretching vibrations of carboxylate groups in BTC	CARBON 49 (2011) 563–572 [3]
1112 and 1030	Phenyl groups	Phys. Chem. Chem. Phys., 2010, 12, 8092–8097 [1]
759 and 735	Phenyl groups	Phys. Chem. Chem. Phys., 2010, 12, 8092–8097 [1]

(B)

Wavenumber (cm ⁻¹)	F. group	References
3135	Aromatic C-H stretching (imidazole)	Journal of Membrane Science, 361 (2010) 28–37 [4]
2929	Aliphatic C-H stretching (imidazole)	Journal of Membrane Science, 361 (2010) 28–37 [4]
1584	C=N stretching	Journal of Membrane Science, 361 (2010) 28–37 [4]
1384	CH ₃ bending	Journal of Membrane Science 532 (2017) 9–19 [5]
1100-1400	C-N absorption bands	Journal of Membrane Science, 361 (2010) 28–37 [4]

(C)

Wavenumber (cm ⁻¹)	F. group	References
3477	Asymmetric vibrations of N–H bonding in the amino group	J. Mater. Chem. A, 2017, 5, 8385–8393 [6]
3363	Symmetric vibrations of N–H bonding in the amino group	J. Mater. Chem. A, 2017, 5, 8385–8393 [6]
1655	C=C from coordinated carboxylate moieties	J. Mater. Chem. A, 2017, 5, 8385–8393 [6]
1575	C=O stretching (from linker)	Ind. Eng. Chem. Res. 2018, 57, 9151–9161 [7]
1502	C=C stretching	Ind. Eng. Chem. Res. 2018, 57, 9151–9161 [7]
1433	C=C from aromatic	J. Mater. Chem. A, 2017, 5, 8385–8393 [6]
1256	C-N bending	Ind. Eng. Chem. Res. 2018, 57, 9151–9161 [7]

2. SURMOF cross-sectional scanning electron microscope (SEM) imaging

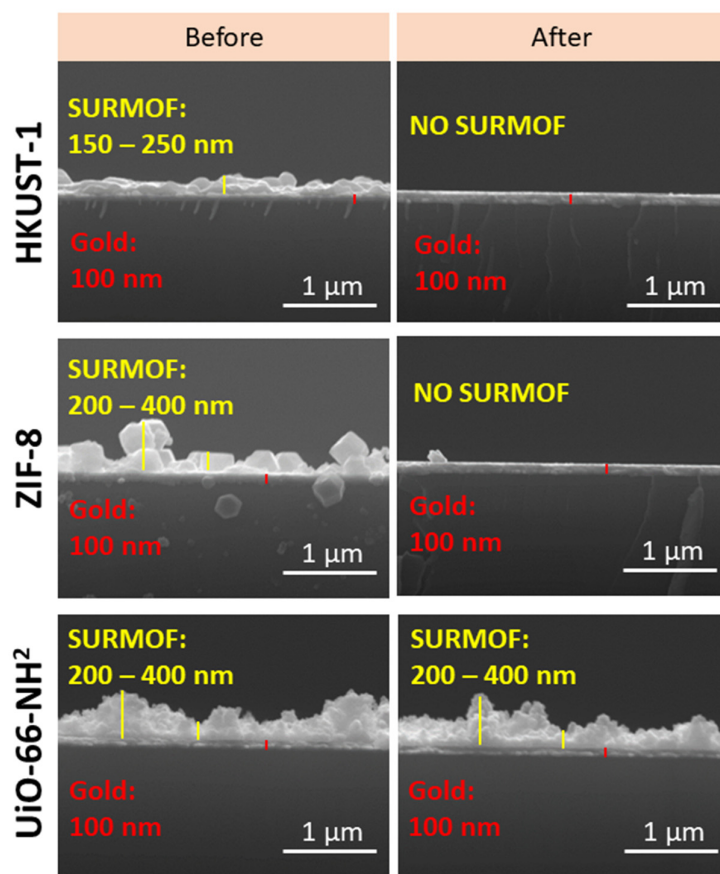


Figure S2. SEM cross sectional images of HKUST-1, ZIF-8, and UiO-66-NH₂ SURMOF films before and after 1 minute immersion in a pH 2 solution.

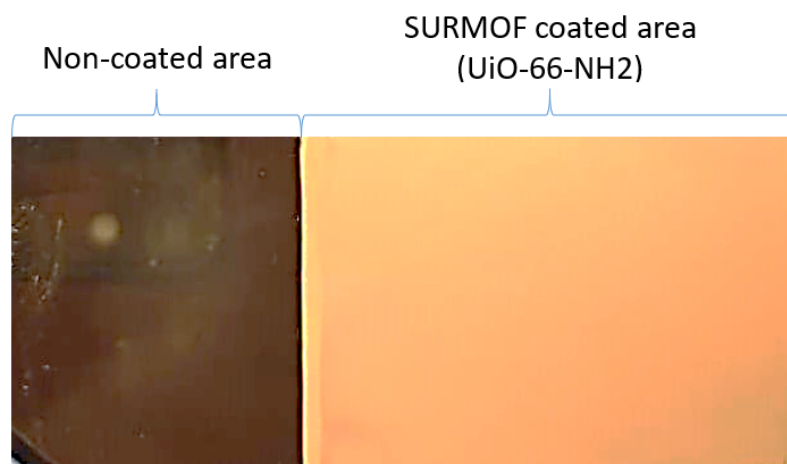


Figure S3. Photograph of UiO-66-NH₂ SURMOF film@gold coated substrate.

References

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