

Covalent Integration of Polymers and Porous Organic Frameworks

Md Amjad Hossain¹, Kira Coe-Sessions¹, Joe Ault¹, Felix Gboyero¹, Michael J. Wenzel¹, Bhausheb Dhokale¹, Alatheia E. Davies¹, Qian Yang², Laura de Sousa Oliveira^{1*}, Xuesong Li^{1*}, and John O. Hoberg^{1*}

¹Department of Chemistry, University of Wyoming, Laramie, 82072 WY, USA

²Center for Advanced Scientific Instrumentation, University of Wyoming, Laramie, 82072 WY, USA

Supplementary Material

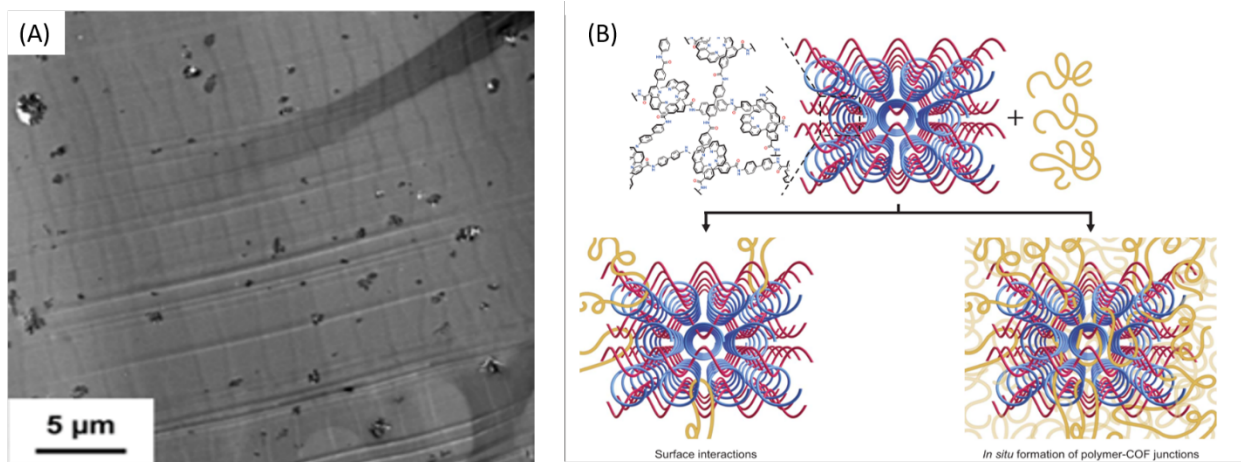


Figure S1 | (A). TEM image of PMMA-MW (3 wt %) showing well-dispersed MW nanocrystals in the PMMA matrix. (B) Polymer-COF interactions. Depending on the polymer, its matrix may either interface only with the surface of the woven COF particles or form so-called polymer-COF junctions. In these junctions, individual polymer chains penetrate the porous, 3D woven COF crystals and decorate the surface to interact with the polymer matrix. Reprinted Permission (Neumann et al., 2024b)

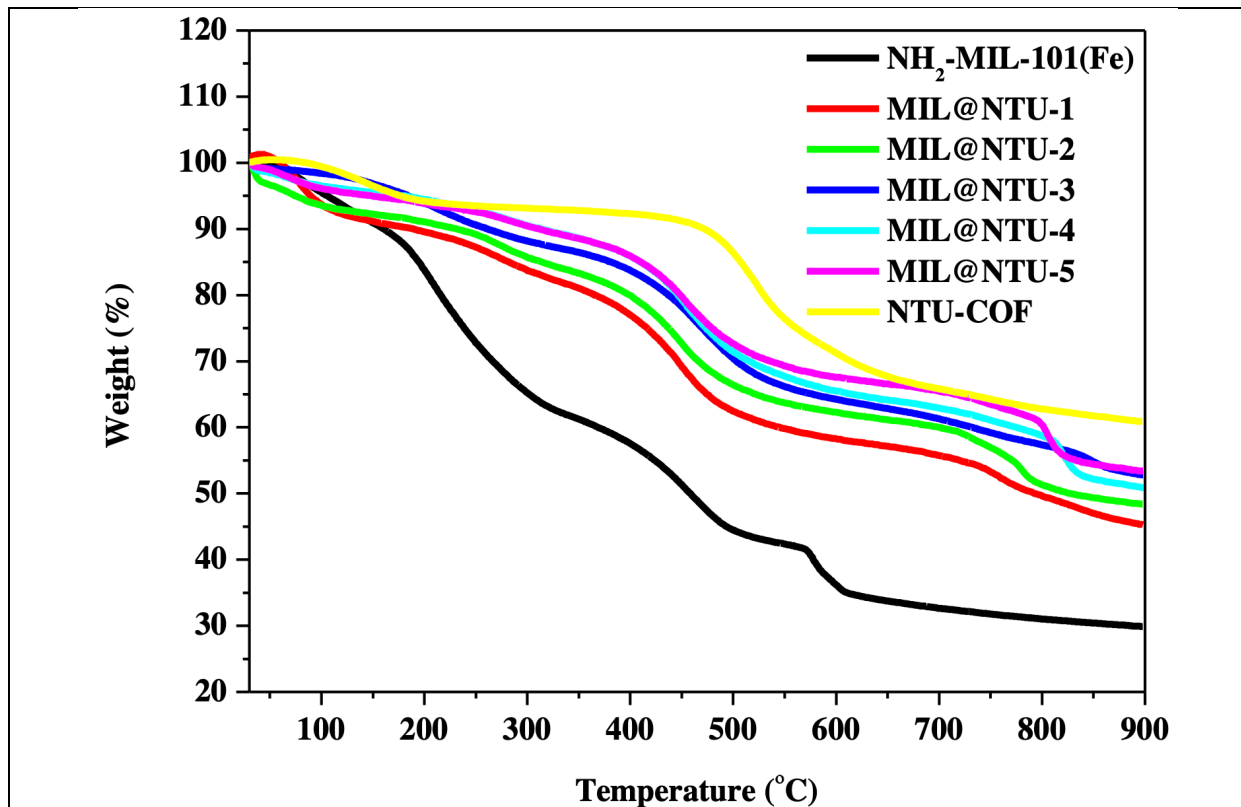


Figure S2 | TGA profiles of NH₂-MIL-101(Fe), MIL@NTU-1, MIL@NTU-2, MIL@NTU-3, MIL@NTU-4, MIL@NTU-5 and MIL@NTU. Reprinted permission(Cai et al., 2019b)

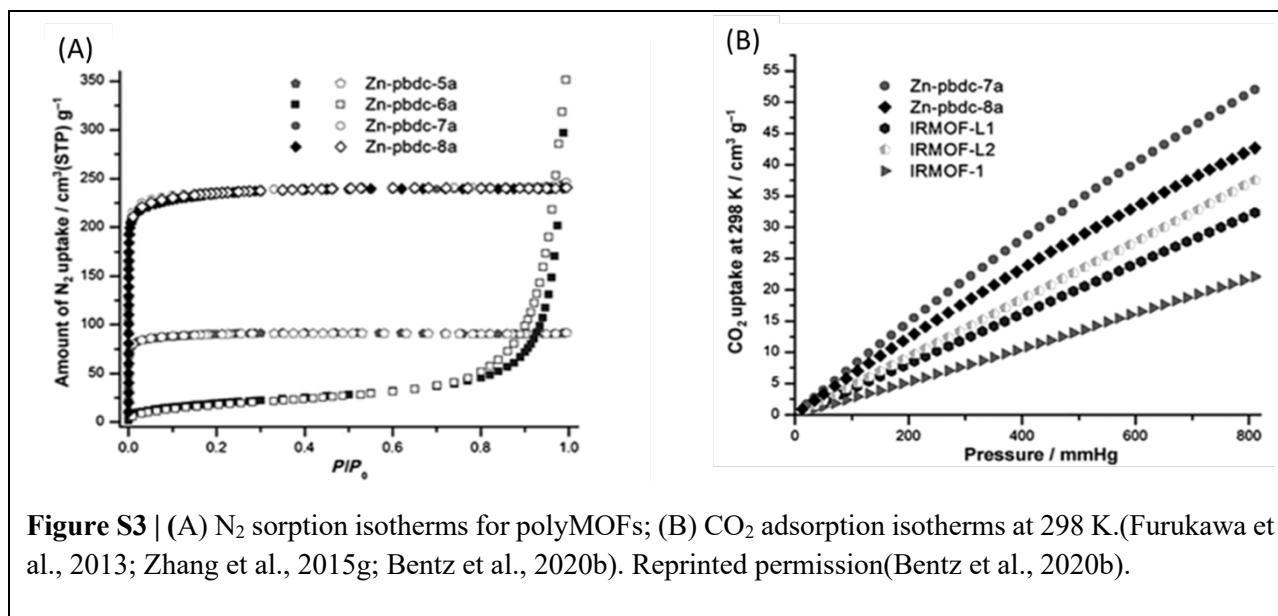
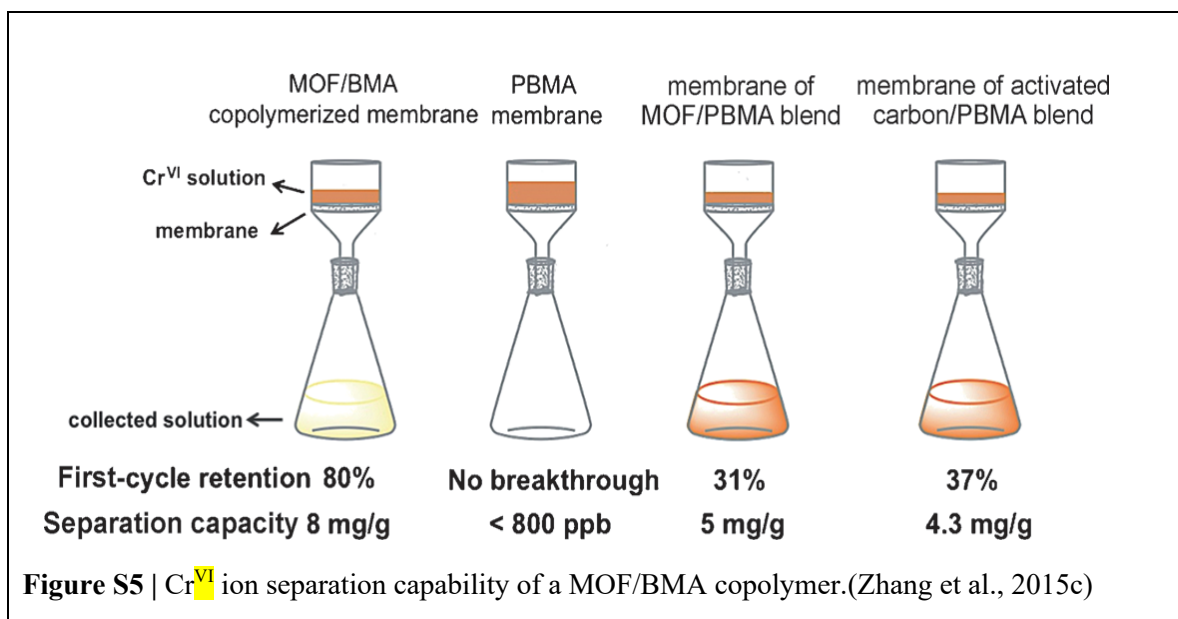
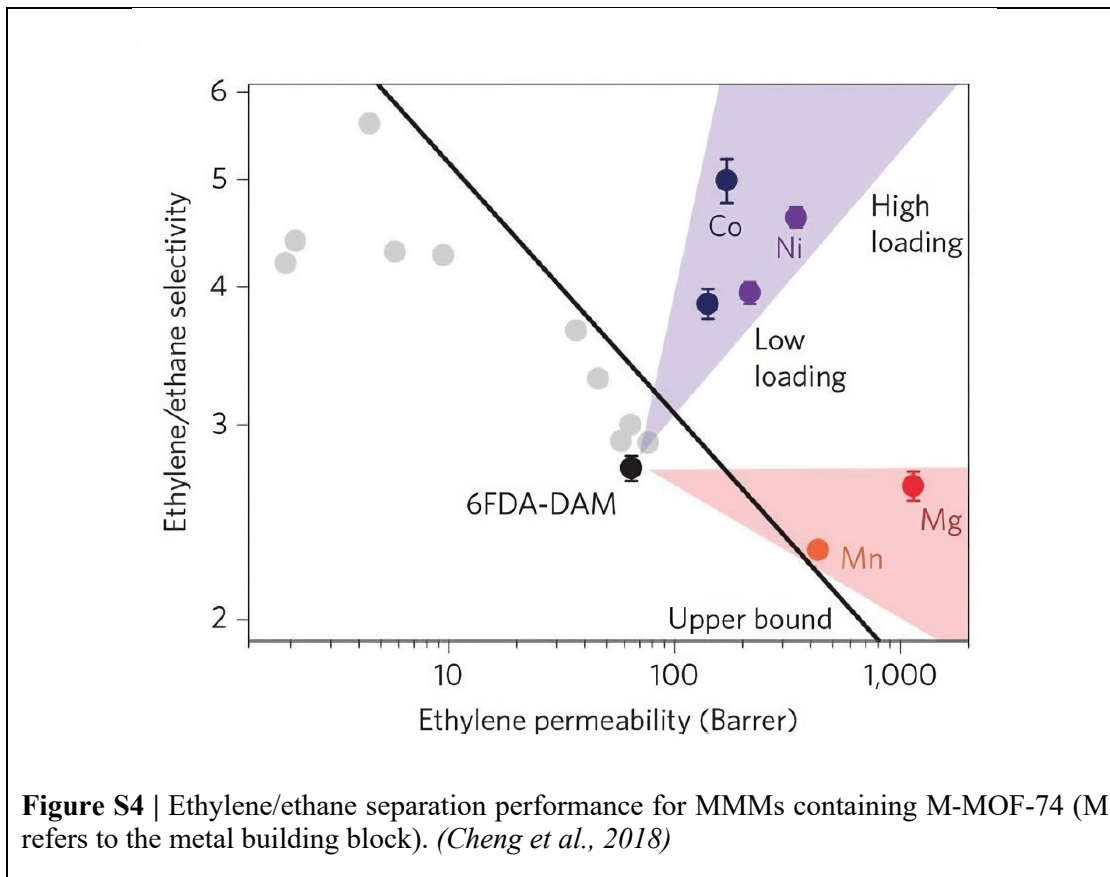


Figure S3 | (A) N₂ sorption isotherms for polyMOFs; (B) CO₂ adsorption isotherms at 298 K.(Furukawa et al., 2013; Zhang et al., 2015g; Bentz et al., 2020b). Reprinted permission(Bentz et al., 2020b).



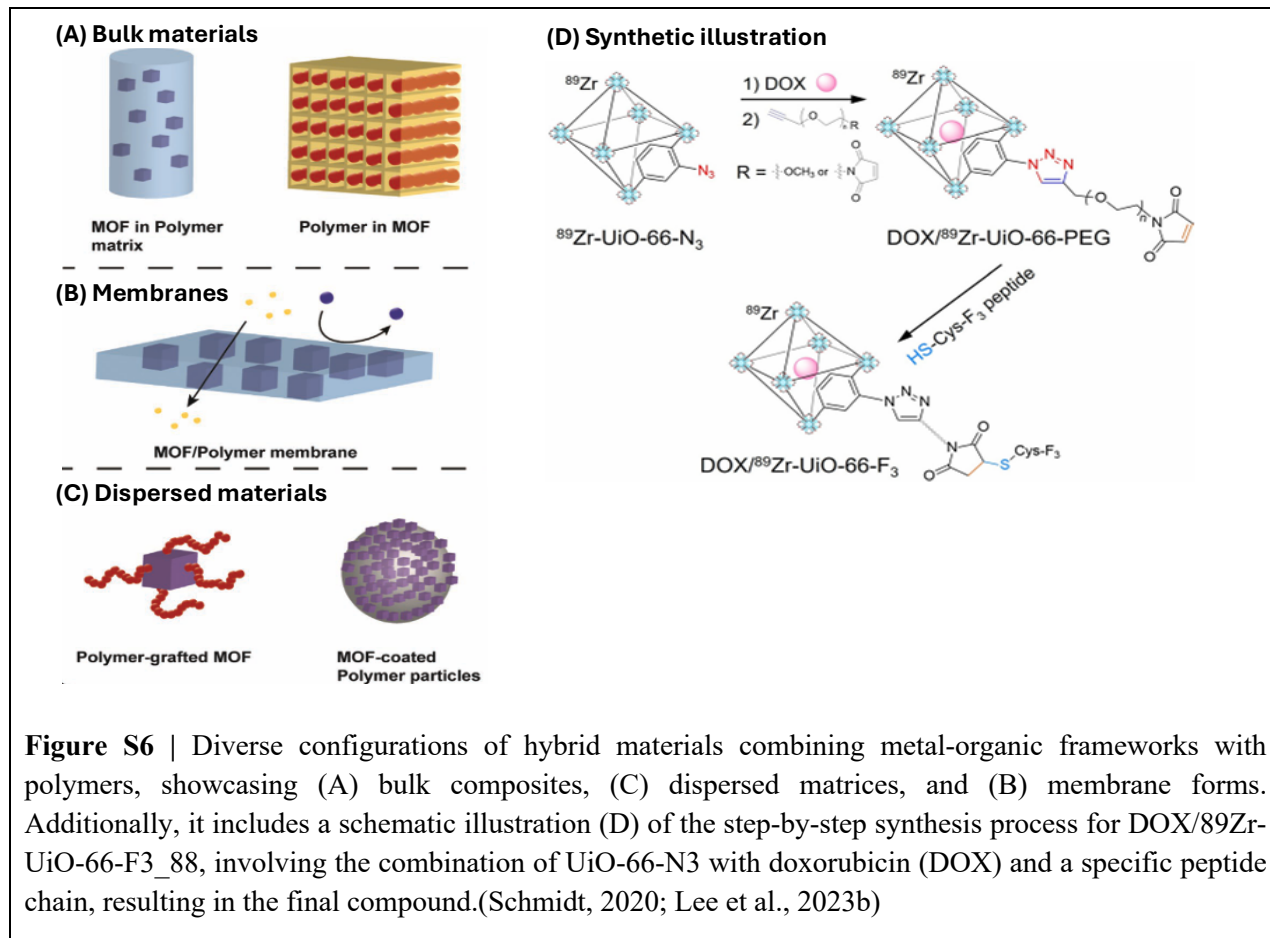


Figure S6 | Diverse configurations of hybrid materials combining metal-organic frameworks with polymers, showcasing (A) bulk composites, (C) dispersed matrices, and (B) membrane forms. Additionally, it includes a schematic illustration (D) of the step-by-step synthesis process for DOX/ ^{89}Zr -UiO-66-F₃_88, involving the combination of UiO-66-N₃ with doxorubicin (DOX) and a specific peptide chain, resulting in the final compound. (Schmidt, 2020; Lee et al., 2023b)

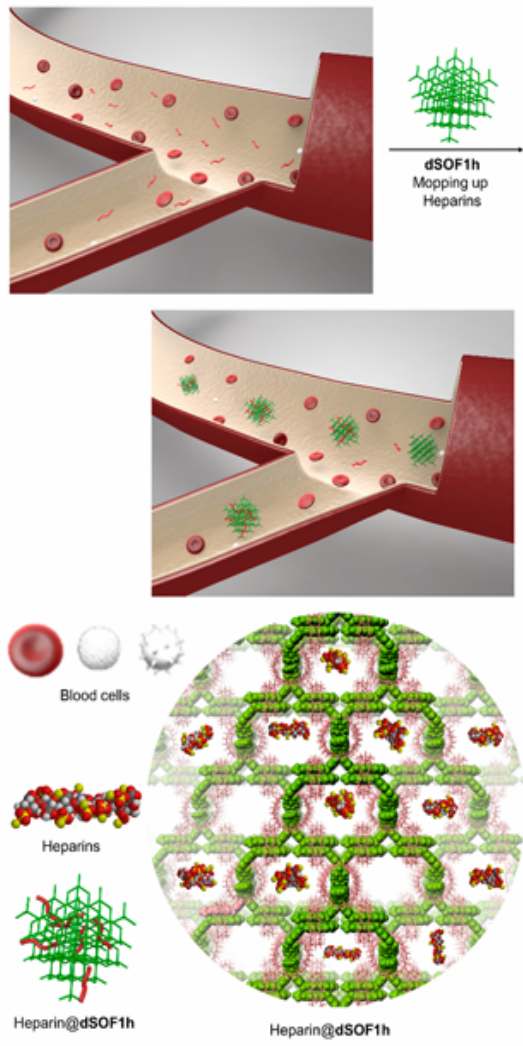


Figure S7 | Schematic illustration of the step-by-step synthesis process for dSOFh, which neutralizes the anticoagulant function of UFH and LMWHs. The diagram shows how dSOFh binds to heparins, preventing their anticoagulant effects while leaving blood cells unaffected.(Li et al., 2022)