

Supporting Information

Synthesis of zeolitic imidazolate framework-78 molecular-sieve membrane: defects formation and elimination

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1. H₂/CO₂ separation performance of the representative MOF membranes

Table S1 Comparison of the H₂/CO₂ mixed-gas separation performance of the ZIF-78 membrane with other MOF membranes from literatures.

Membrane	Pore size (nm)	Thickness (μm)	Temperature (°C)	H ₂ /CO ₂ separation factor	H ₂ permeance (mol·m ⁻² ·s ⁻¹ ·Pa ⁻¹)	Reference
HKUST-1	0.9	25	25	4.6	6.74×10 ⁻⁷	[1]
HKUST-1	0.9	60	25	6.8	10×10 ⁻⁷	[2]
NH ₂ -MIL-53	0.75	15	15	30.9	19.85×10 ⁻⁷	[3]
ZIF-7	0.29	1.5	200	6.5	0.77-0.8×10 ⁻⁷	[4]
ZIF-7	0.29	2	220	13.6	0.45×10 ⁻⁷	[5]
ZIF-8	0.34	12	25	6.0	1.0×10 ⁻⁷	[6]
ZIF-22	0.29	40	50	7.2	1.6-1.9×10 ⁻⁷	[7]
ZIF-90	0.35	20	200	7.3	2.37×10 ⁻⁷	[8]
ZIF-90 ^[a]	-	20	200	15.3	2.02×10 ⁻⁷	[9]
ZIF-78	0.38	25	25	9.5	0.97×10 ⁻⁷	this work

[a] imine-functionalized ZIF-90 membrane

2. Robeson plot for H₂/CO₂ mixtures

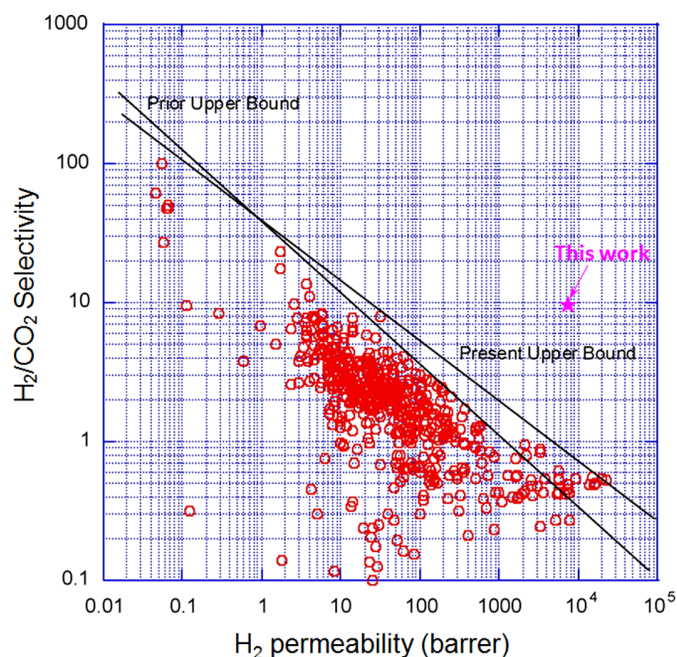


Fig. S1 Robeson plot for H₂/CO₂ mixtures,^[10] the H₂/CO₂ separation performance of ZIF-78 membrane is included.

Reference

- (1) J. P. Nan, X. L. Dong, W. J. Wang, W. Q. Jin and N. P. Xu, *Langmuir*, 2011, **27**, 4309.
- (2) H. L. Guo, G. S. Zhu, I. J. Hewitt and S. L. Qiu, *J. Am. Chem. Soc.*, 2009, **131**, 1646.
- (3) F. Zhang, X. Q. Zou, X. Gao, S. J. Fan, F. X. Sun, H. Ren and G. S. Zhu, *Adv. Funct. Mater.*, 2012, DOI: 10.1002/adfm.201200084.
- (4) Y. S. Li, F. Y. Liang, H. Bux, A. Feldhoff, W. S. Yang and J. Caro, *Angew. Chem., Int. Ed.*, 2010, **49**, 548.
- (5) Y. S. Li, F. Y. Liang, H. Bux, W. S. Yang and J. Caro, *J. Membr. Sci.*, 2010, **354**, 48.
- (6) H. Bux, A. Feldhoff, J. Cravillon, M. Wiebcke, Y. S. Li and J. Caro, *Chem. Mater.*, 2011, **23**, 2262.
- (7) A. S. Huang, H. Bux, F. Steinbach and J. Caro, *Angew. Chem., Int. Ed.*, 2010, **49**, 4958.
- (8) A. S. Huang, W. Dou and J. Caro, *J. Am. Chem. Soc.*, 2010, **132**, 15562.
- (9) A.S. Huang and J. Caro, *Angew. Chem., Int. Ed.*, 2011, **50**, 4979
- (10) L. M. Robeson, *J. Membr. Sci.*, 2008, **320**, 390.