Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supplementary Information

Mixed matrix membranes incorporated with size-reduced Cu-BTC for improving gas separation

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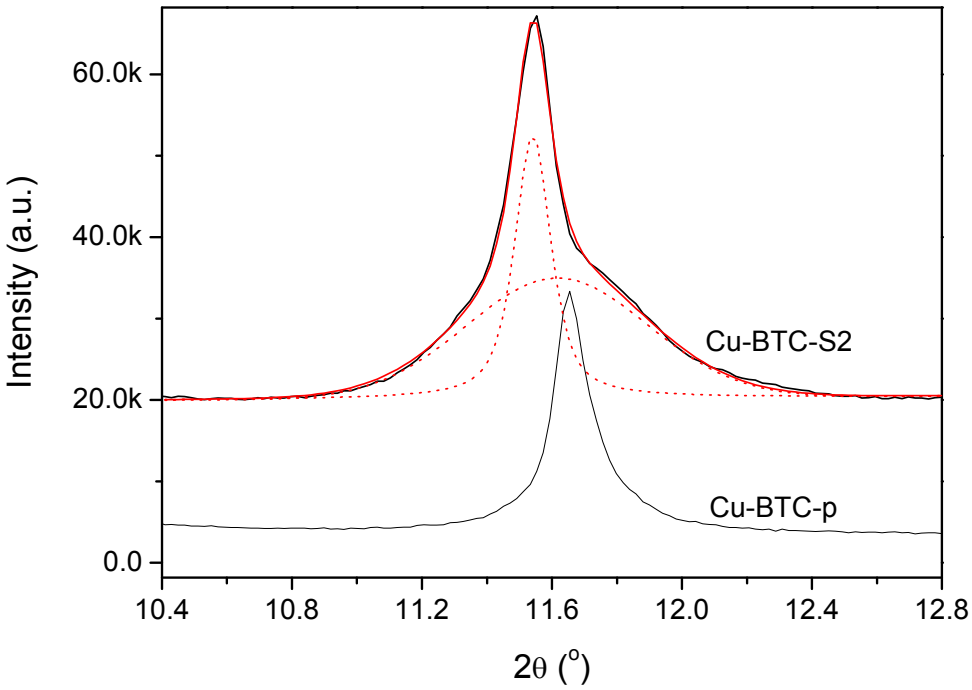

Fig.S1 XRD (222) peaks of Cu-BTC-p and Cu-BTC-S2, and curve fitting of (222) peak of Cu-BTC-S2 in red color

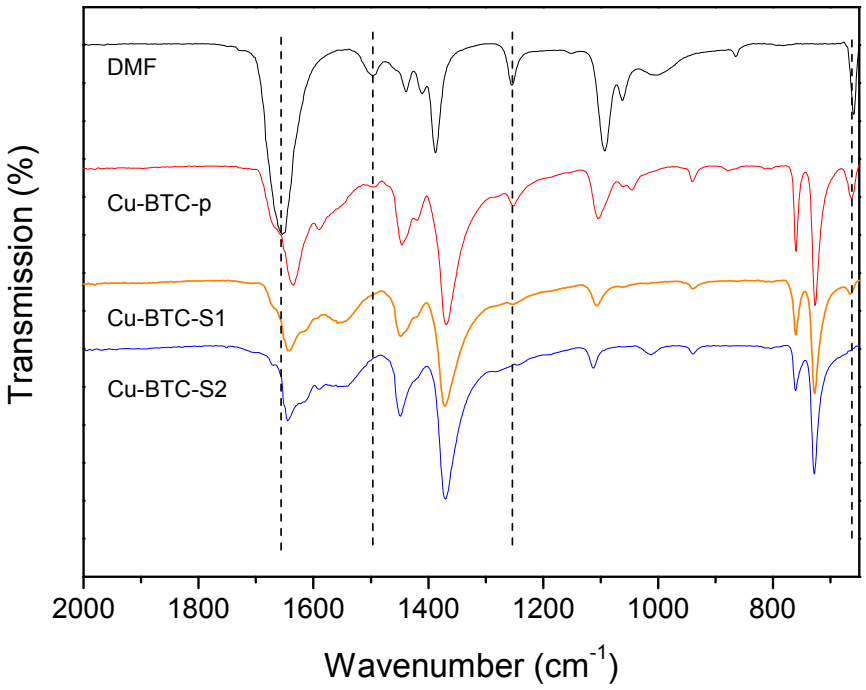

Fig. S2 FTIR-ATR spectra of DMF solvent, as-synthesized and sonication-treated Cu-BTC crystals

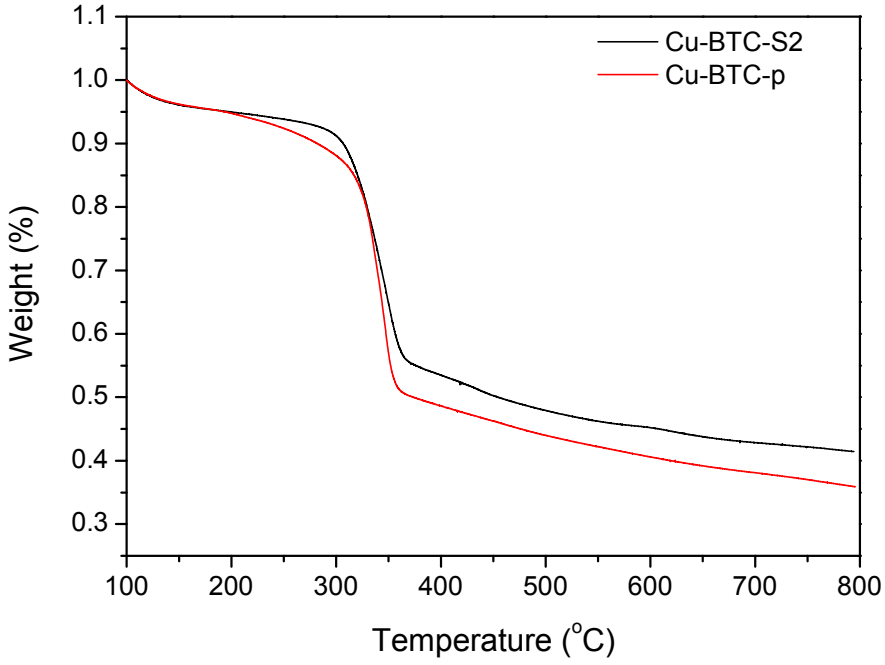

Fig.S3 TGA curves of Cu-BTC-p and Cu-BTC-S2

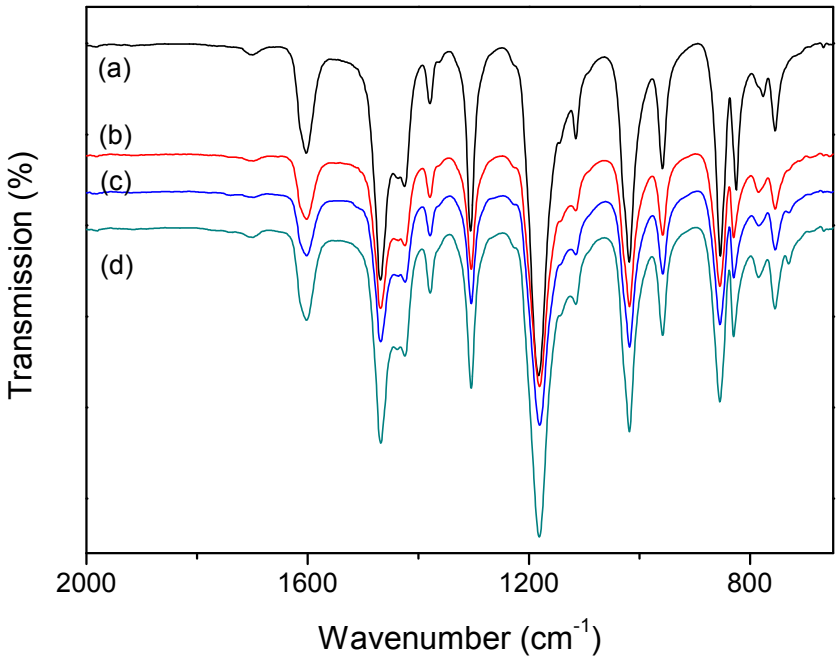

Fig.S4 FTIR-ATR spectra of pure PPO membrane (a) and Cu-BTC/PPO MMMs (b: 10% Cu-BTC-p, c: 10% Cu-BTC-S1, d: 10% Cu-BTC-S2)

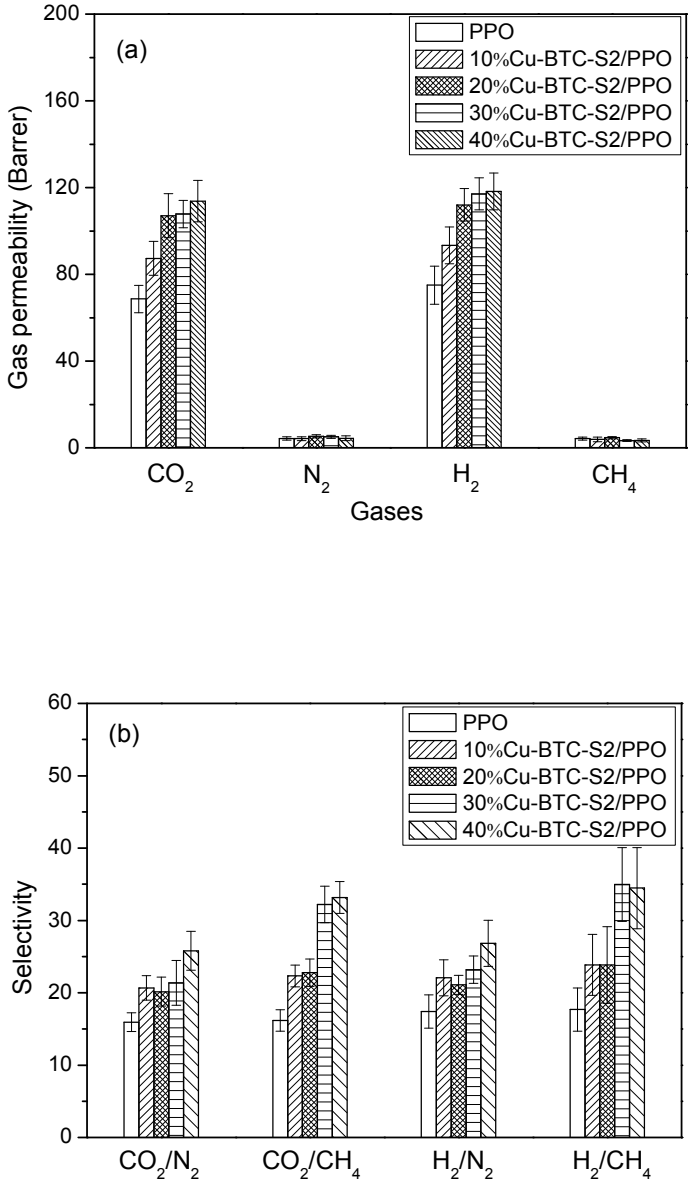

Fig.S5 Gas permeance and selectivity of pure PPO membrane and MMMs with various Cu-BTC-S2 loading amounts

Table S1 Structure parameters of Cu-BTC-p, Cu-BTC-S1 and Cu-BTC-S2 based on Le Bail refinements

Samples	Space Group	Lattice Parameters (Å)	*R* factors (%)			
			R_{exp}	R_{wp}	R_p	χ^2
Cu-BTC-p	Fm-3m	26.2980(20)	2.25	4.16	3.09	1.85
Cu-BTC-S1	Fm-3m	26.3232(13)	1.92	3.69	2.83	1.92
Cu-BTC-S2	Fm-3m	26.4167(87)	1.21	8.77	5.26	7.28

Table S2 IR frequency assigned to the Cu-BTC/PPO bands

Frequency, cm^{-1}	Vibration
855	Aromatic C-H bending
960	C-O-C bending
1020	Trigonal ring breathing
1120	C-O-C anti-stretching
1180	Plane C-H bending
1300	C-O-C, C-C bridge bond
1380	CH_3 symmtric bending
1420-1450	C-C aromatic stretching
1469	CH_2 bending, CH_3 anti-bending
1600	C-C aromatic ring
1645	Anti-symmetric stretch vibrations of the carboxylate group
1112	C-H in plane bending mode of the aromatic ring