

Supporting Information

**Constructing gas transmission pathways of two-dimensional
composite material ZIF-8@BNNS mixed matrix membranes
to enhance CO₂/N₂ separation performance**

Legend of Figures

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Figure S2. SEM surface image of the ZIF-8@BNNS/Pebax membrane loaded with

(a) 5 wt% (b) 10 wt% (c) 15 wt%

Figure S3. SEM cross-section image of the ZIF-8@BNNS/Pebax membrane loaded

with (a) 5 wt% (b) 10 wt% (c) 15 wt% (d) 20 wt%

Figure S4. HRTEM images (a) of the ZIF-8@BNNS corresponding SAED pattern (b)

Figure S5. SEM image and EDS mapping (Zn and B) of MMM loaded with 20 wt%

Legend of Tables

Table S1. CO₂ permeability and CO₂/N₂ selectivity of MMMs with different BNNS loadings and different pressures

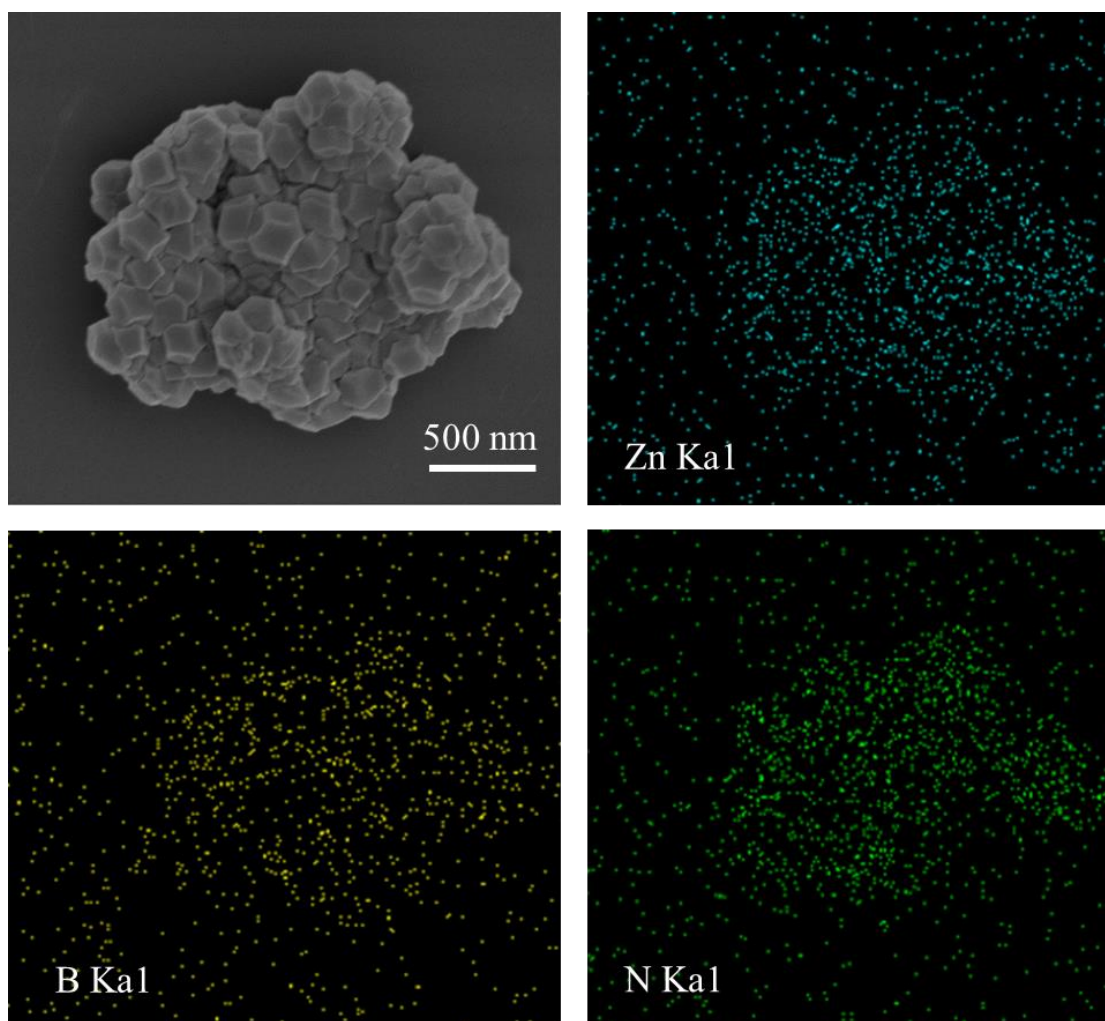


Figure S1. SEM image and EDS mapping (Zn, B and N) of ZIF-8@BNNS.

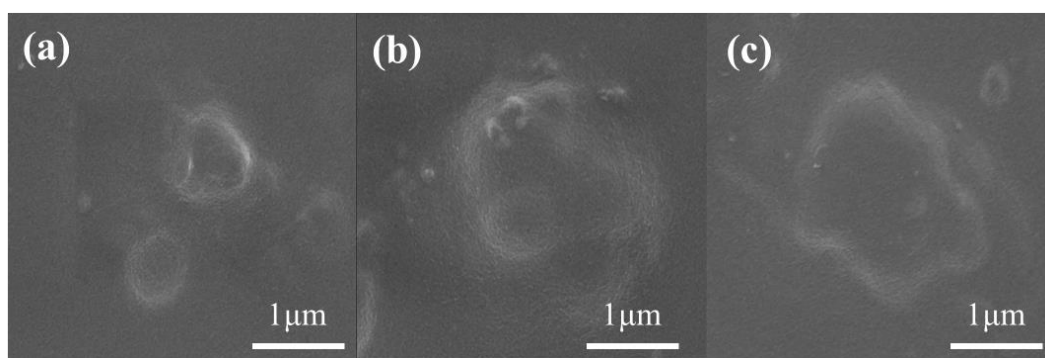


Figure S2. SEM surface image of the ZIF-8@BNNS/Pebax membrane loaded with (a) 5 wt% (b) 10 wt% (c) 15 wt%

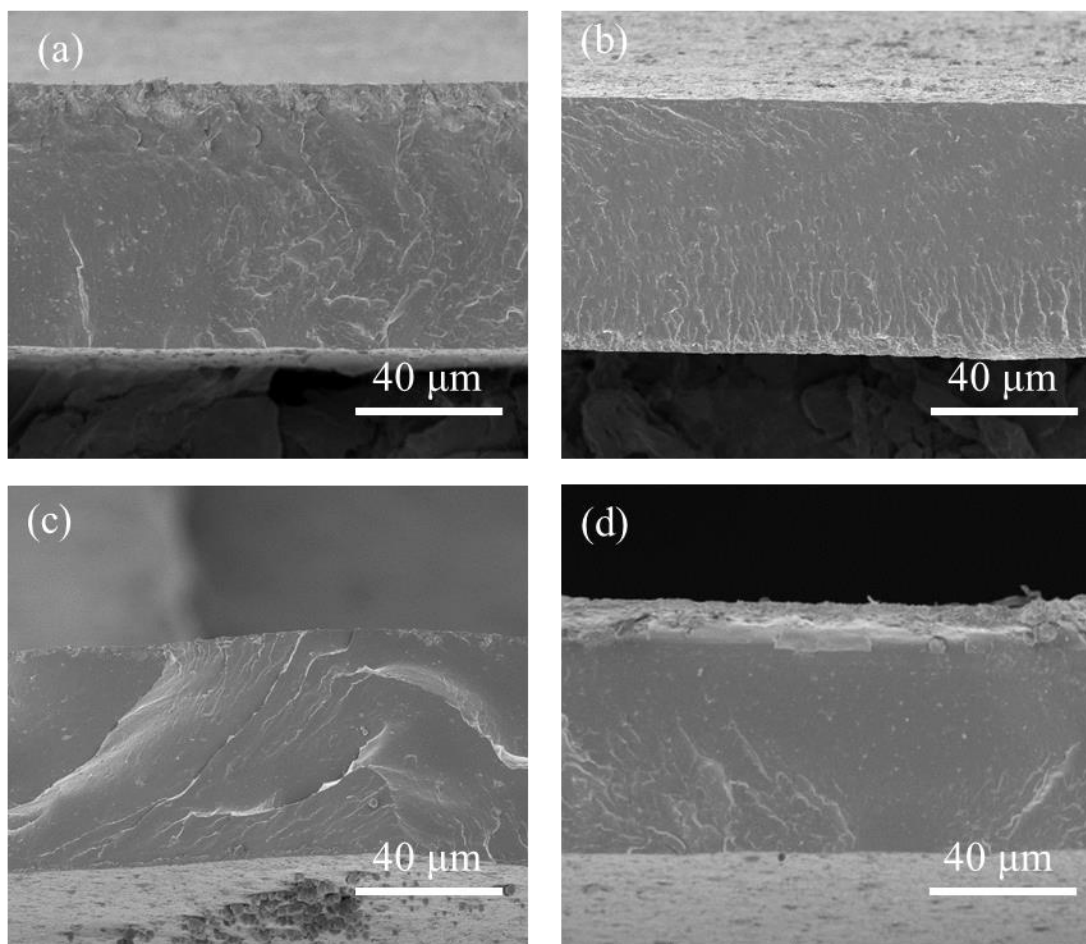


Figure S3. SEM cross-section image of the ZIF-8@BNNS/Pebax membrane loaded with (a) 5 wt% (b) 10 wt% (c) 15 wt% (d) 20 wt%

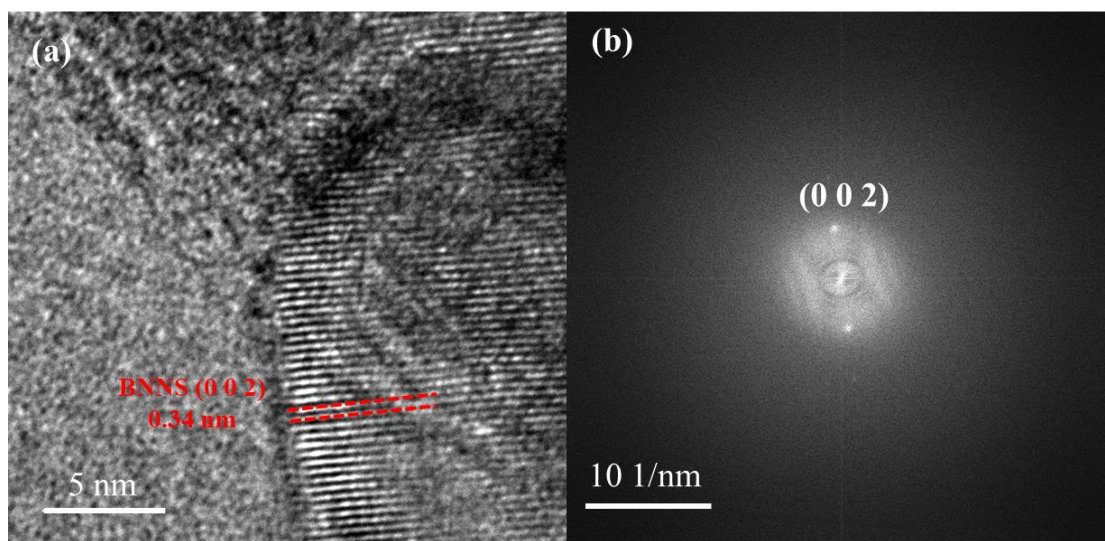


Figure S4. HRTEM images (a) of the ZIF-8@BNNS corresponding SAED pattern (b)

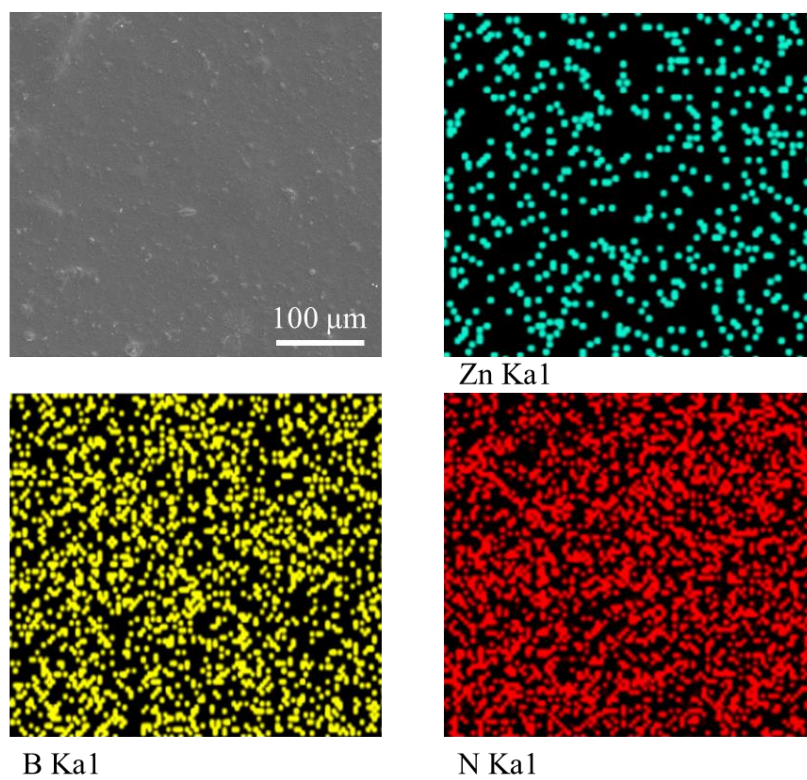


Figure S5. SEM image and EDS mapping (Zn and B) of MMM loaded with 20 wt%

Table S1. CO₂ permeability and CO₂/N₂ selectivity of MMMs with different BNNS loadings and different pressures

Loadings (wt%)		Pressure (bar)		
		1	3	5
0	P _{CO2}	78.73	80.97	81.97
	S _{CO2/N2}	47.98	48.37	48.79
0.5	P _{CO2}	60.91	62.89	63.42
	S _{CO2/N2}	54.38	55.91	56.21
1	P _{CO2}	43.98	45.03	45.96
	S _{CO2/N2}	62.86	63.56	64.01
2	P _{CO2}	37.65	38.86	39.62
	S _{CO2/N2}	56.96	57.62	58.17