

SUPPORTING INFORMATION

Core-membrane microstructured amine-modified mesoporous biochar templated via ZnCl_2/KCl for CO_2 capture

1 Particle size distribution

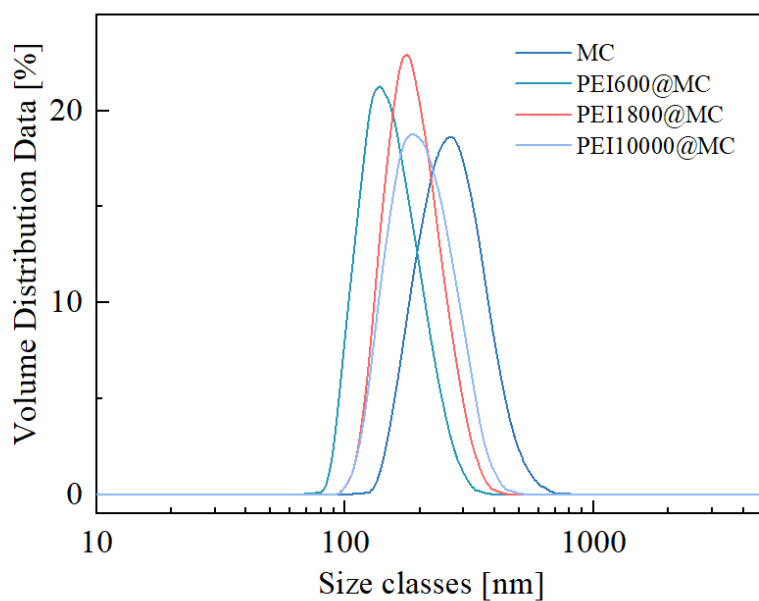


Fig. S1 Particle size distribution of samples.

2 Density experiment

The density experiment testing is conducted using a high- and low-pressure adsorption analyzer (H-Sorb 2600TL, Ultmetrics China). The procedure involves weighing the empty reactor, and calibrating its volume with helium at three different pressures. Subsequently, samples with a certain weight are added, and the volume is recalibrated under the same condition.

Table S1 Density experiment parameters through volume calibration by helium gas

Materials	Volume/mL	Mass/g	Density/(g·cm ⁻³)
Empty	9.6490	189.6695	-
MC	9.6058	189.6928	0.5394
PEI600@MC	9.5805	189.7289	0.8672
PEI1800@MC	9.6049	189.7079	0.8707
PEI10000@MC	9.5606	189.7455	0.8597

3 BET of recycled PEI-600@MC

Table S2 Detailed porous properties of PEI-600@MC and recycled PEI-600@MC

Samples	$V_t/(\text{cm}^3 \cdot \text{g}^{-1})$	$V_0/(\text{cm}^3 \cdot \text{g}^{-1})$	$V_m/(\text{cm}^3 \cdot \text{g}^{-1})$
PEI-600@MC	0.1912	0.0000	0.1912
Recycled PEI-600@MC	0.1216	0.0000	0.1216

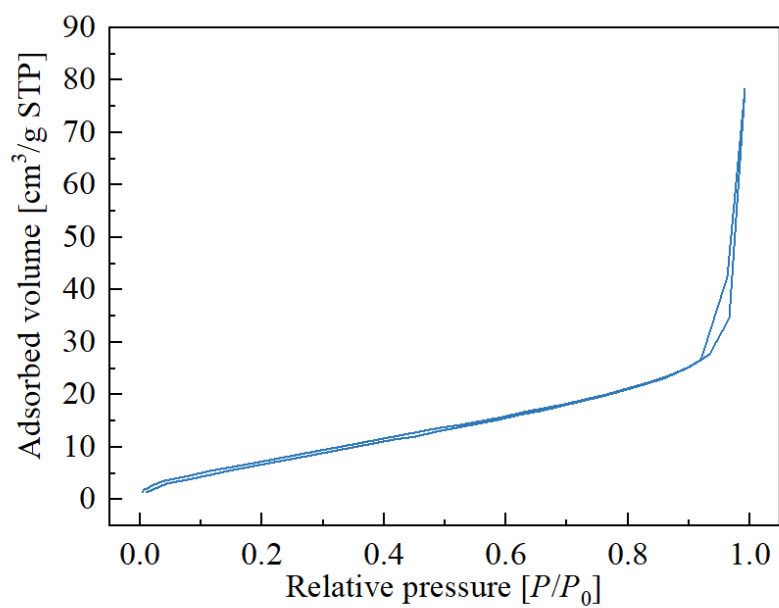


Fig. S2 N₂ adsorption-desorption isotherms of recycled PEI-600@MC.

4 Sorption isotherm restructured models

Table S3 Parameters and regression correlation coefficients derived from fitting equilibrium isotherms of PEI-600@MC

Models	Parameters	Temperature/°C		
		50	70	90
Langmuir model	q_m	2.06	3.53	2.54
	B	24.95	15.85	6.72
	R^2	0.9990	0.9999	0.9998
Freundlich model	K	2.02	3.38	2.27
	n	9.61	7.78	3.99
	R^2	0.9996	0.9997	0.9992
Toth model	q_m	1.99	3.57	2.67
	B	25.45	16.33	8.26
	n	1.32	0.97	0.84
	R^2	0.9848	0.9979	0.9998
Sips model	q_m	2.16	3.71	2.59
	B	11.27	8.97	5.84
	n	0.65	0.75	0.94
	R^2	0.9992	0.9999	0.9998
Temkin model	A	41611.69	4711.98	115.9
	B	0.19	0.4	0.47
	R^2	0.9997	0.9999	0.9998

5 N₂ sorption isotherms

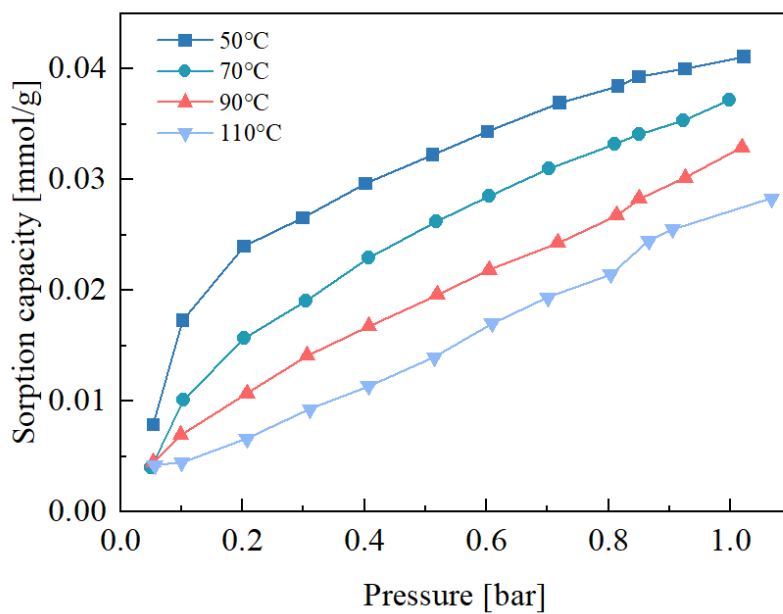


Fig. S3 N₂ sorption isotherms.