Supporting Information

Enhancement of CO_2 adsorption/desorption properties of solid sorbents using tetraethylenepentamine/diethanolamine blends

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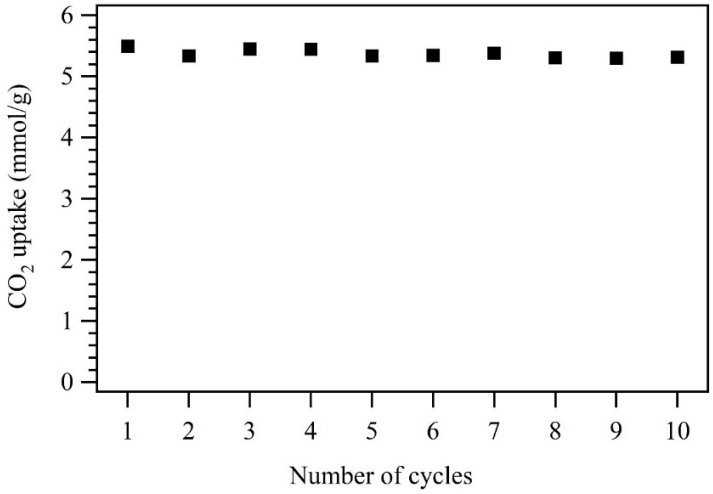

Figure S1. CO_2 adsorption–desorption over ten cycles of TEPA40-DEA30/MSU-F after 18-month storage measured using pure CO_2 at 50 °C followed by N_2 sweep at 80°C.

After preparation of TEPA40-DEA30/MSU-F, the obtained dry sorbents were stored in a Laboran screw vial at room temperature for 18 months as in the previous study.[S1] After that, the cyclic CO_2 adsorption–desorption test was conducted by thermal gravimetric analysis using an analyzer (STA 449 F3 Jupiter, Netzsch Gerätebau-GmbH, Selb, Germany). The sorbent was degassed by heating at 80 °C for 6 h under N_2 flow at a flow rate of 50 mL/min. Then, the sorbent was cooled to 50 °C for the adoption process with pure CO_2 followed by the desorption at 80 °C for 50 min with a N_2 sweep. The adsorption capacity of fresh TEPA40-DEA30/MSU-F was 5.9 mmol/g at 100 kPa CO_2 and 50 °C.[S2] The result in this figure indicated that the CO_2 uptake was reduced to approximately 5.4 mmol/g during the long-term storage due to the oxidative degradation, as discussed in a previous study.[S1] However, it was also demonstrated that the CO_2 adsorption–desorption performance can be maintained still stable.

Table S1. Comparison of adsorption capacity of several amine solid sorbents at the CO_2 partial pressure of 10 kPa

Support	Amine	Temperature (°C)		Capacity (mmol/g)	Ref.
		Adsorption	Desorption		
MSU-F	TEPA-DEA	40	80	5.2	This work
MPS	Linear poly-L-alanine	50	110	3.9	S3
SBA-15	TEPA	75	105	3.5	S4
Fly ash extraction	PEI	75	100	3.0	S5,6
Silica gel	PEI-piperazine	75	100	3.2	S7

MPS: three-dimensional interconnected macroporous silica; SBA-15: Santa Barbara Amorphous-15; The comparison was based on the review by Dutcher et al.[S8]

References

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