Electronic Supplementary Information

Effect of phase-separated structure on CO$_2$ separation performance of poly(amidoamine) dendrimer immobilized in a poly(ethylene glycol) network

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1H NMR spectra of PEGDMAs.

Fig. S1 shows 1H NMR spectra of purified PEG\textsubscript{1k}DMA (EG unit: 23) and PEG\textsubscript{2k}DMA (EG unit: 45). A triplet peak at 4.30 ppm (signal c) corresponds to methylene protons next to ester oxygen, indicating progress of the reaction.

**Fig. S1** 1H NMR spectra of (A) PEG\textsubscript{1k}DMA and (B) purified PEG\textsubscript{2k}DMA in CDCl\textsubscript{3} at 298 K. Me\textsubscript{4}Si as an internal standard.
**Determination of average PAMAM dendrimer domain size.**

The processed 2D images at each depth are summed, and the summed image was Fourier transformed to give a plot of $q_m^2 I(q_m)$ as a function of $q_m$ as represented in Fig. S2. In this case, a sharp peak ($q_m = 3.11 \, \mu m^{-1}$) was found, which corresponded to a length of periodic structure $\Lambda_m (= 2.02 \, \mu m$ by Eq. 4).

![Fig. S2](image)

**Fig. S2** A Kratky plot of the magnitude of the Fourier transformation as a function of the wavenumber and the Lorentzian fitting. The polymeric membrane contained PAMAM dendrimer with 50 wt% in crosslinked PEGDMA (EG unit: 14).