

Electronic Supplementary Information for:

Control of osmotic pressure through CO₂-capture and release facilitated by lower critical solution temperature (LCST) phase transition of acylated branched polyethylenimine

Authors: Jeongseon Park, Minwoo Noh, Min Keun Chey, Yeongbong Mok, Ji-Hun Seo and Yan Lee*

Table of contents:

Fig. S1. Synthetic scheme of Bu-PEI (a) and Bu-Val-PEI (b).

Fig. S2. ¹H NMR spectra of Bu-PEI (a) and Bu-Val-PEI (b).

Fig. S3. CO₂ release rate of (a) *b*-PEI and Bu-PEI solutions at the amine concentration of 3.4 m at 70°C, (b) *b*-PEI, Bu-PEI and Bu-Val-PEI solutions at the amine concentration of 1.7 m at 40°C.

Fig. S4. Osmotic flux (a) from NaCl solutions to a *b*-PEI solution (amine concentration: 3.4 m) at 25°C and (b) from the *b*-PEI solution to NaCl solutions at 70°C. Osmotic flux (c) from NaCl solutions to a *b*-PEI solution (amine concentration: 1.7 m) at 15°C and (d) from the *b*-PEI solution to NaCl solutions at 40°C. Osmotic flux (e) from NaCl solutions to a Bu-PEI solution (amine concentration: 1.7 m) at 15°C and (f) from the Bu-PEI solution to NaCl solutions at 40°C. CO₂-free and CO₂-saturated conditions are represented as white and grey bars, respectively. Each error bar means the standard deviation of three measurements.

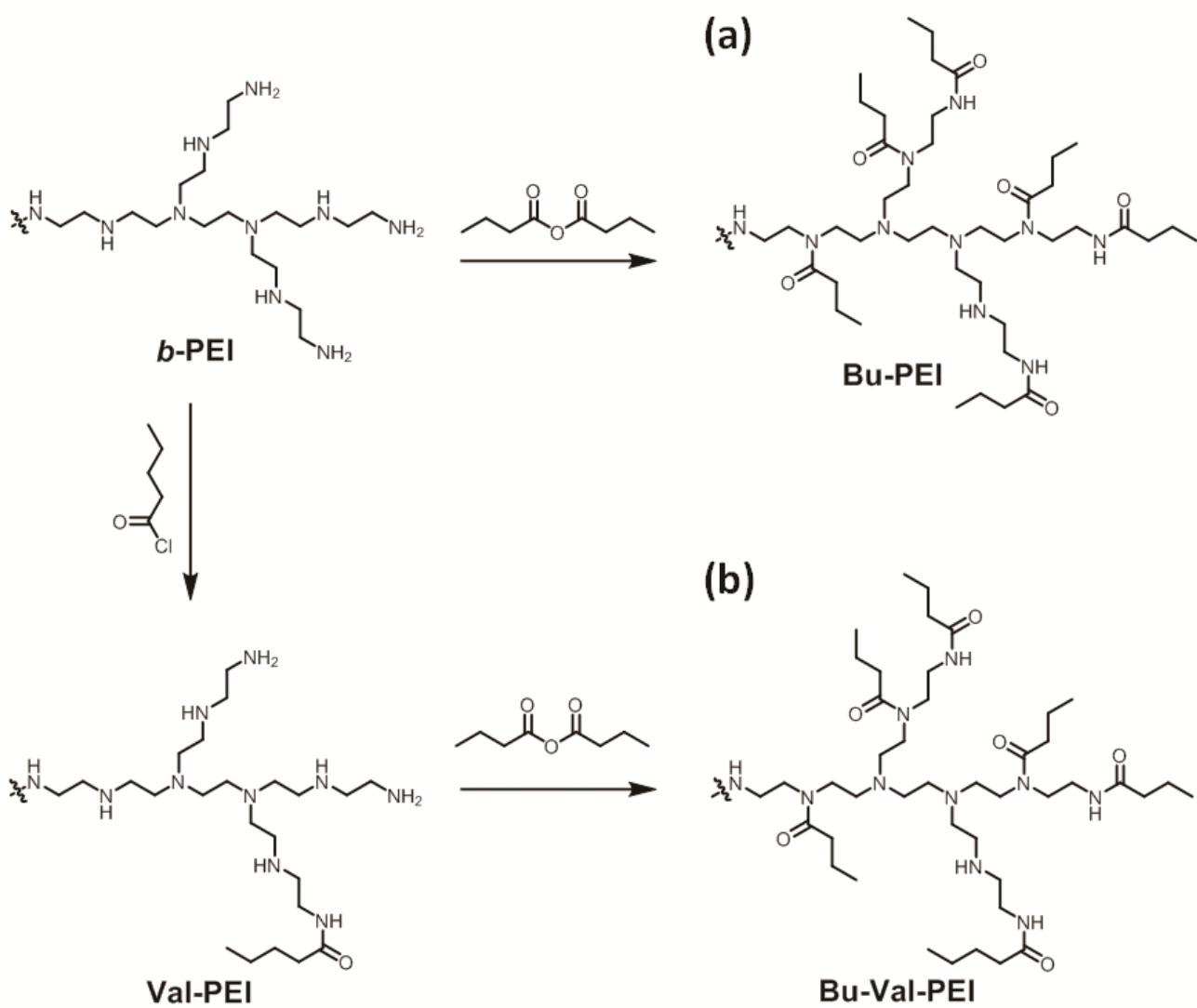


Fig. S1. The synthetic scheme of Bu-PEI (a) and Bu-Val-PEI (b).

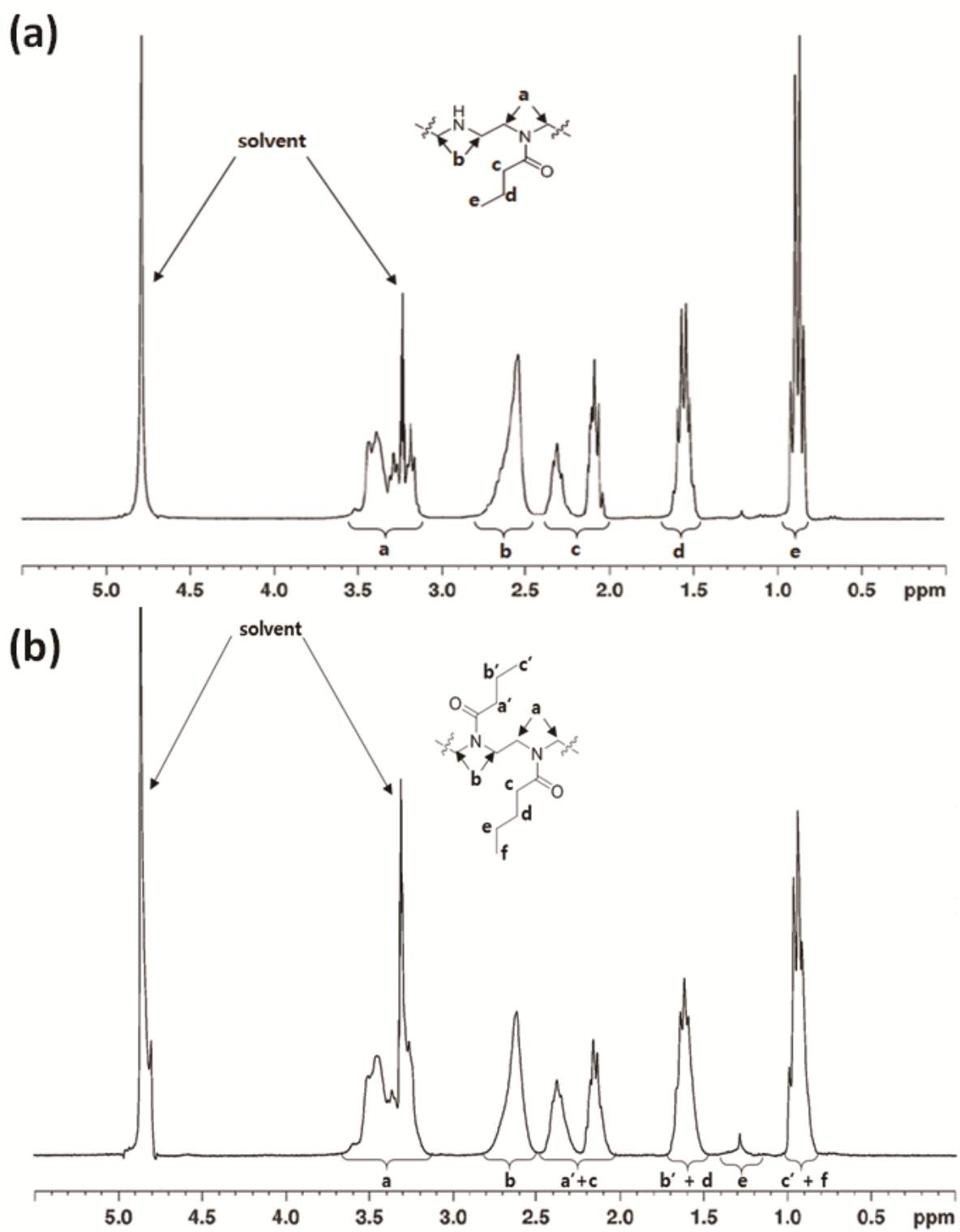


Fig. S2. ^1H NMR spectra of Bu-PEI (a) and Bu-Val-PEI (b).

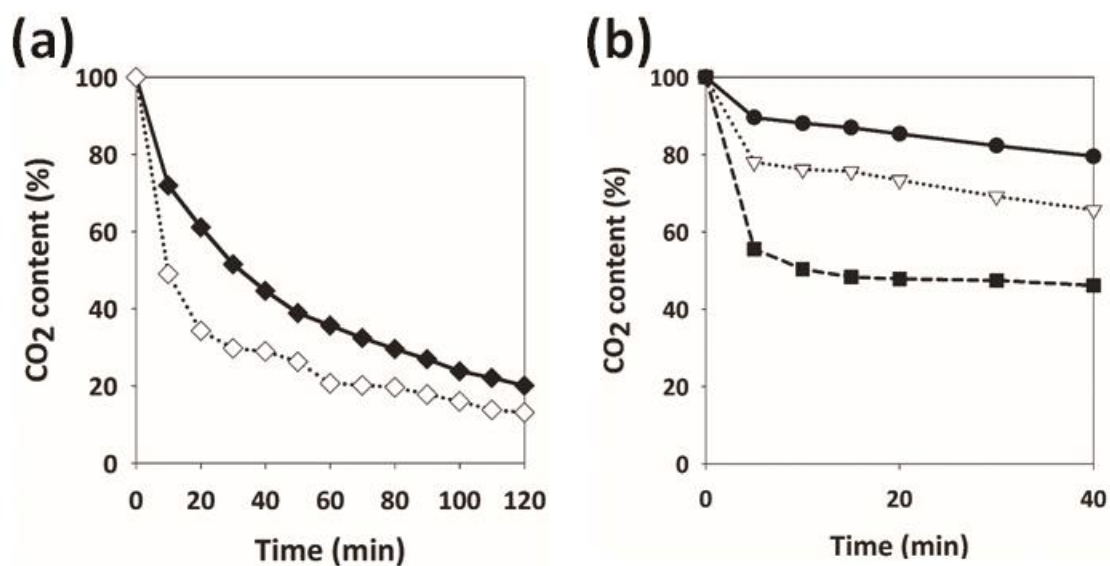


Fig. S3. CO₂ release rate of (a) *b*-PEI and Bu-PEI solutions at the amine concentration of 3.4 m at 70°C, (b) *b*-PEI, Bu-PEI and Bu-Val-PEI solutions at the amine concentration of 1.7 m at 40°C.

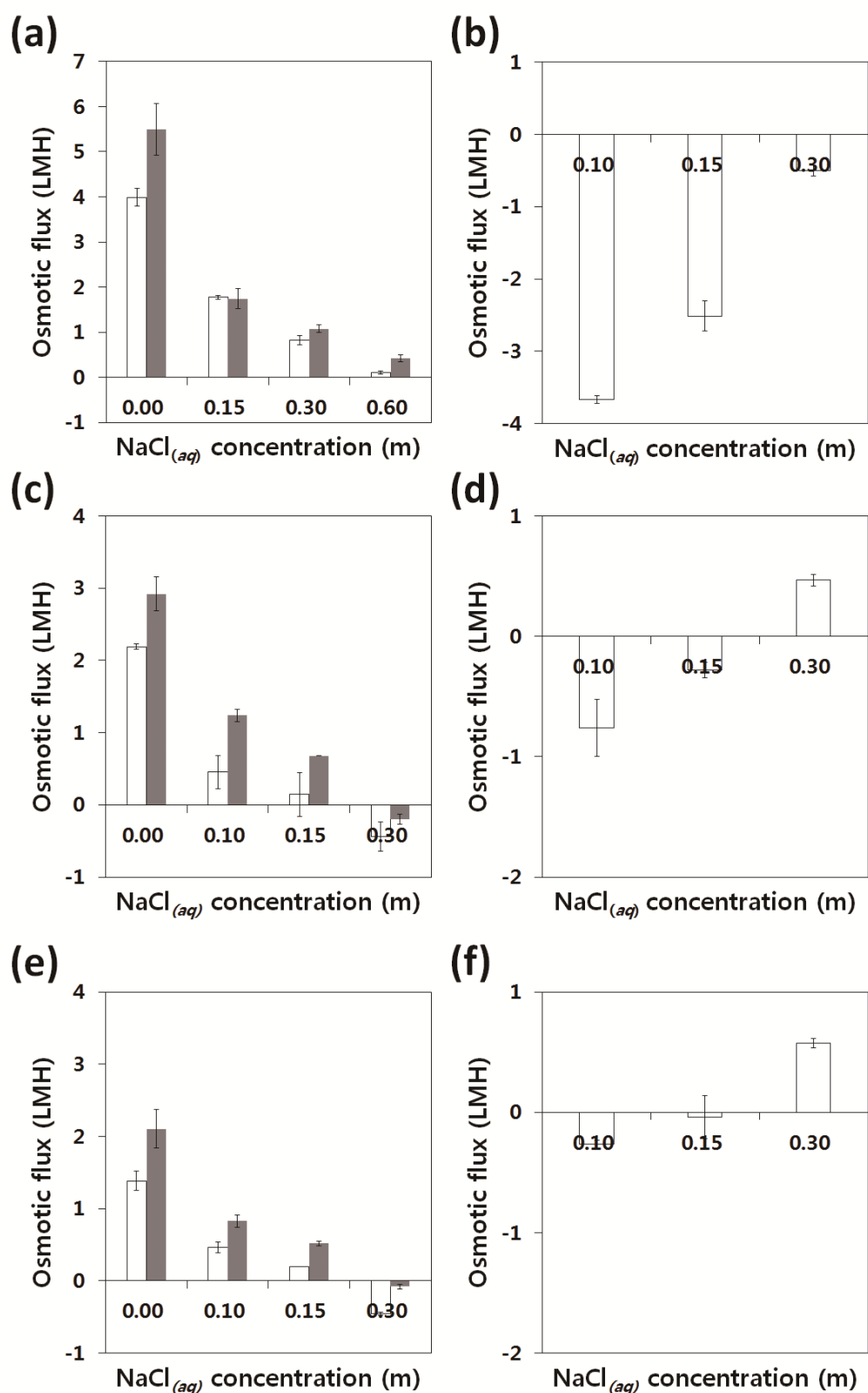


Fig. S4. Osmotic flux (a) from NaCl solutions to a *b*-PEI solution (amine concentration: 3.4 m) at 25°C and (b) from the *b*-PEI solution to NaCl solutions at 70°C. Osmotic flux (c) from NaCl solutions to a *b*-PEI solution (amine concentration: 1.7 m) at 15°C and (d) from the *b*-PEI solution to NaCl solutions at 40°C. Osmotic flux (e) from NaCl solutions to a Bu-PEI solution (amine concentration: 1.7 m) at 15°C and (f) from the Bu-PEI solution to NaCl solutions at 40°C. CO₂-free and CO₂-saturated conditions are represented as white and grey bars, respectively. Each error bar means the standard deviation of three measurements.