Electronic Supplementary Information

Investigation of CO_2 Capture Mechanisms of Liquid-like Nanoparticle Organic Hybrid Materials via Structural Characterization

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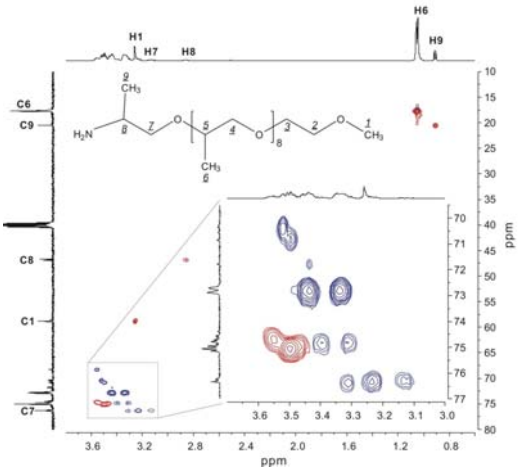

Figure S1. 2D ^{1}H-^{13}C edited HSQC NMR spectra of Jeffamine M-600 in DMSO-d_6 at 298 K. Red contour exhibits carbons of CH or CH_3 (up) whereas blue contour is associated with CH_2 (down). Peaks in the range of δ_H = 3.70 − 2.86 ppm of horizontal ^{1}H spectra correspond to CH and CH_2 protons of Jeffamine M-600.

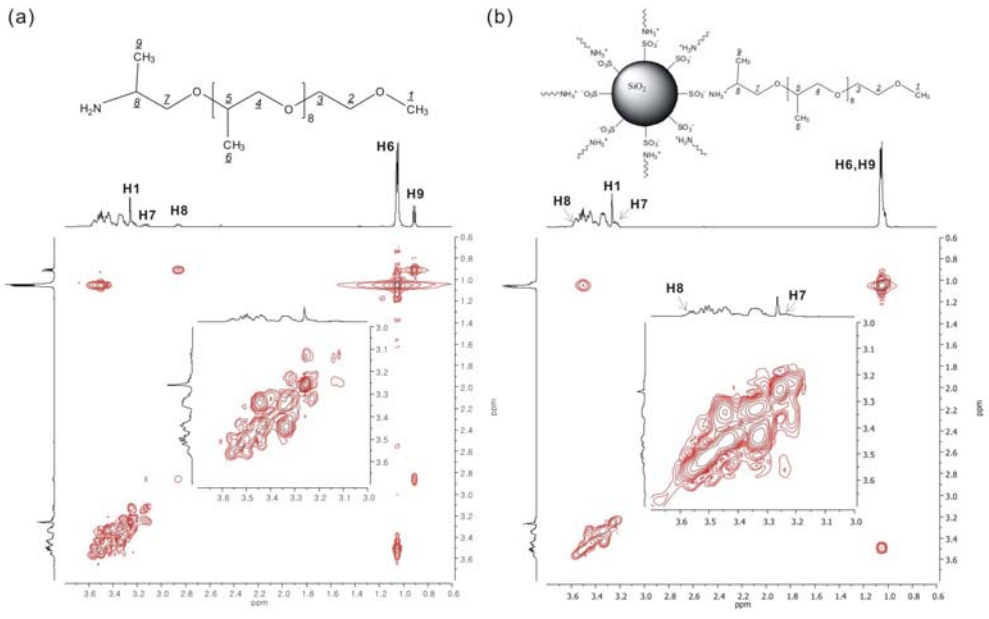

Figure S2. 2D COSY NMR spectra of (a) Jeffamine M-600 and (b) NOHM-I-PE600 in DMSO-d_6 at 298 K.

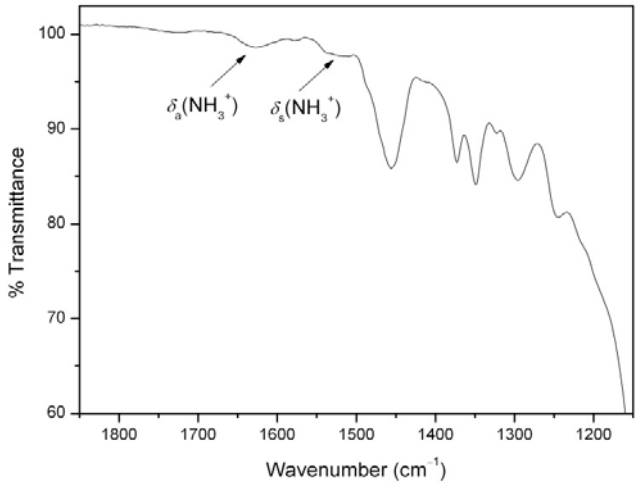

Figure S3. ATR FT-IR spectrum of NOHM-I-PE600 in the range of bending modes of $-NH_3^+$.

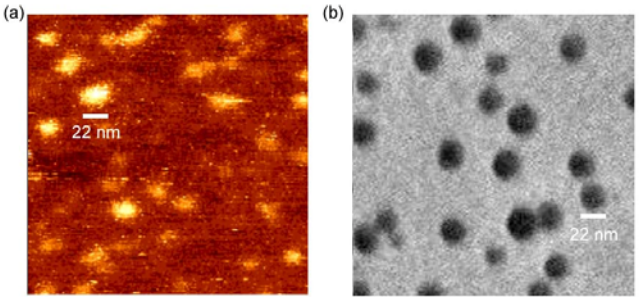

Figure S4. (a) AFM and (b) TEM images of NOHM-I-PE2070 (22 nm SiO_2 core). For the AFM measurements, NOHM-I-PE2070 was dissolved into acetone (7 mg/ml) and the solution was spin-coated at 4000 rpm on a freshly cleaved mica substrate (V−4 grade muscovite). The sample was mounted on the AFM and scanned using a silicon probe (PPP-NCHR, NANOSENSORS™ (Switzerland)) with a resonance frequency of ~ 300 kHz and a force constant of 42 N/m.

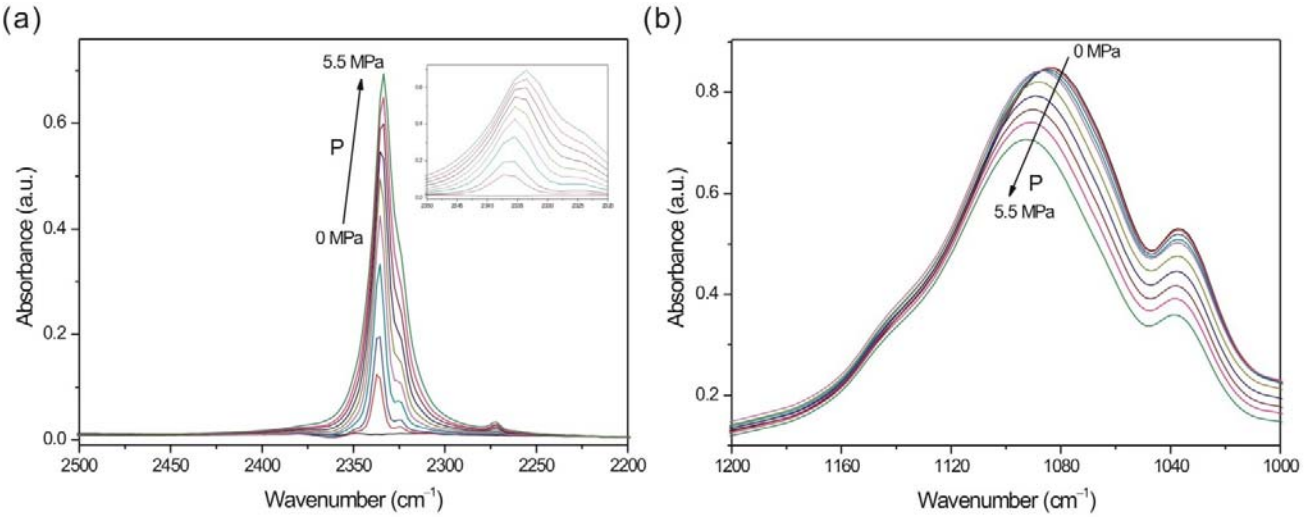

Figure S5. ATR FT-IR Spectra of NOHM-I-PE2070 under elevated CO_2 partial pressure at 298 K. (a) Intensity changes of v_3 band of CO_2 absorption at 2335 cm^{-1} as a function of pressure (0 − 5.5 MPa). (b) Intensity changes of the absorption bands of C−O (sigma bond) as a function of CO_2 pressure (0 − 5.5 MPa).

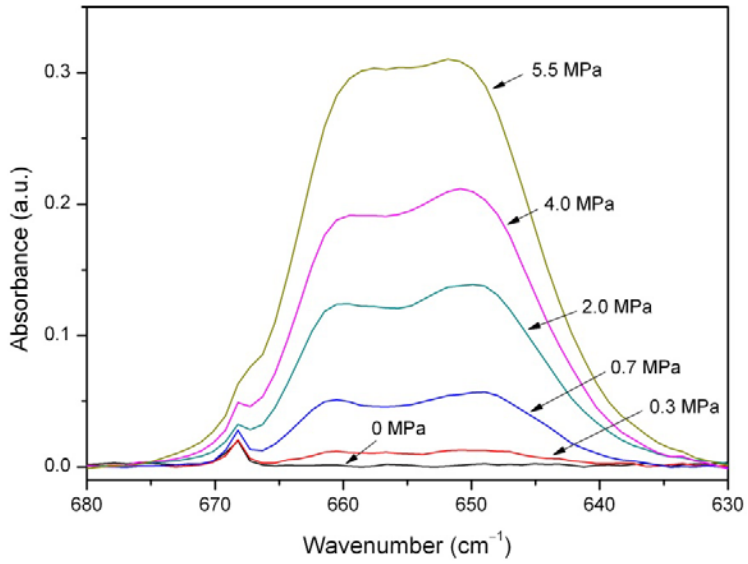

Figure S6. ATR FT-IR peak behavior of v_2 band of CO_2 as a function of pressure (0 − 5.5 MPa) at 298 K.