Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supplementary Information

User-friendly synthesis of nitrogen-containing polymer and microporous carbon spheres for efficient CO_2 capture

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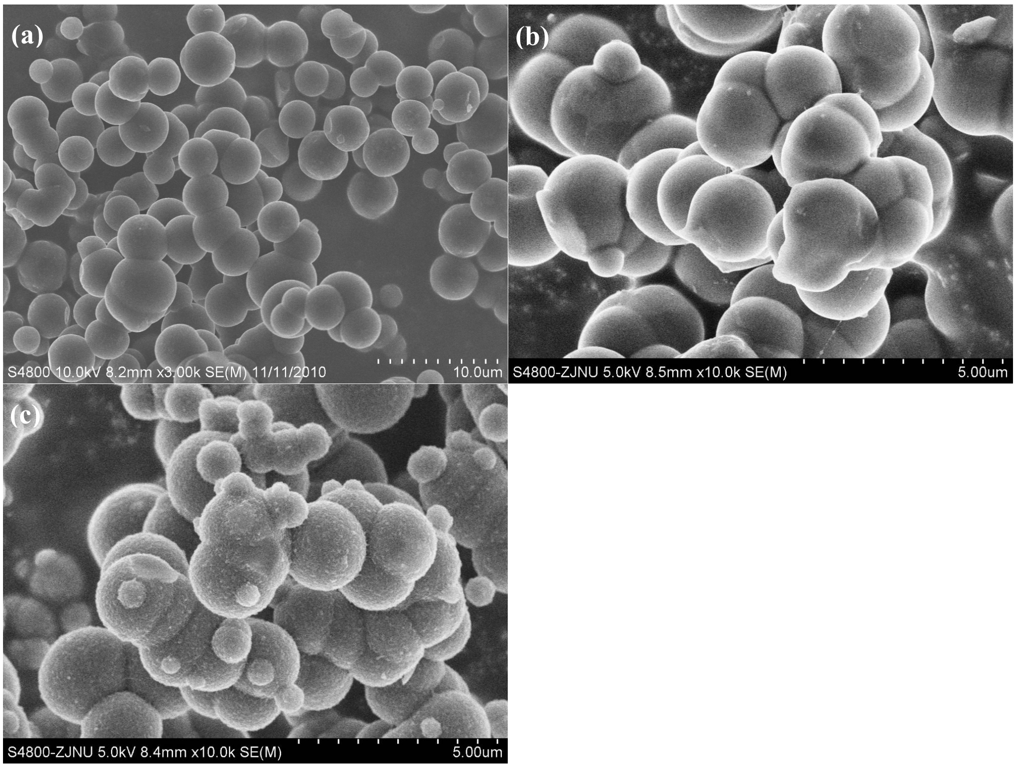

Figure S1. SEM images of (a) PHMT-60, (b) PHMT-100 and (c) PHMT-130.

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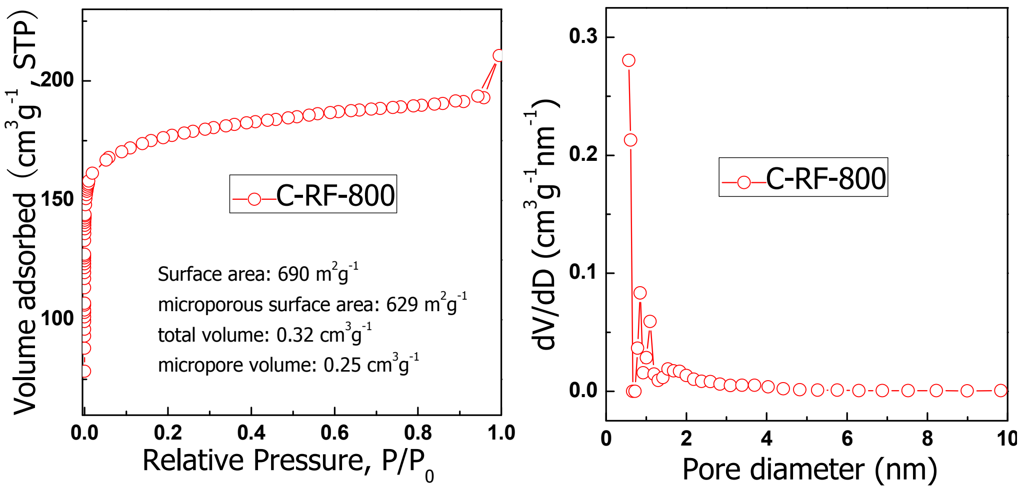

Figure S2. Nitrogen sorption isotherm and the corresponding pore size distribution curve of C-RF-800 obtained by carbonization of resorcinol-formaldehyde polymer at 800 °C.

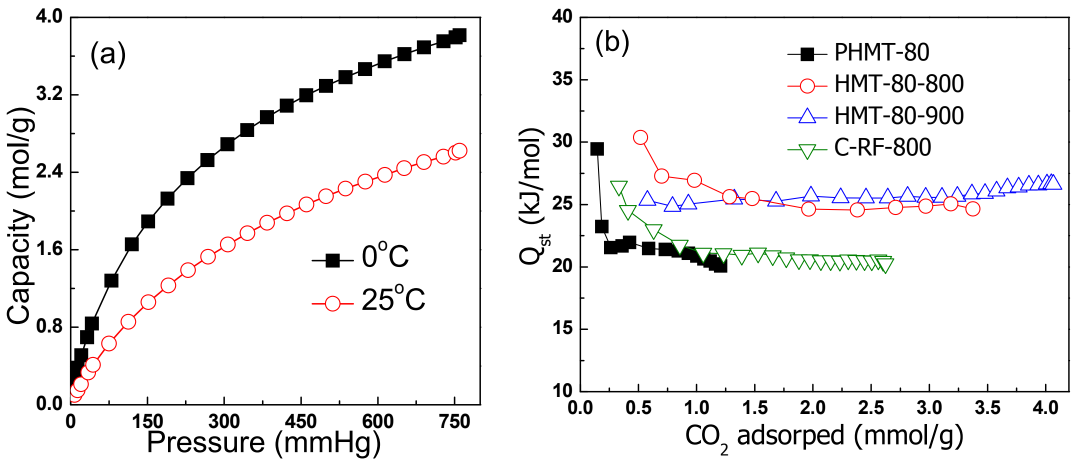

Figure S3. CO_2 capture capacities of C-RF-800 at 0 °C and 25 °C (a) and isosteric heat of adsorption for CO_2 at different CO_2 loadings (b).

C-RF-800 shows a CO_2 capture capacity of 2.6 mmol/g, much lower than that of HMT-80-600 (3.3 mmo/g) and HMT-80-800 (3.6 mmol/g). Considering the similar microporous surface area of C-RF-800 and HMT-80-600, it can be conclude that the nitrogen-containing groups play an important role in CO_2 capture. The initial Q_{st} for C-RF-800 was 26.5 kJ mol^{-1}, much lower than that of HMT-80-800 of 30.4 kJ mol^{-1}. The high Q_{st} for HMT-80-800 is due to favorable interactions between adsorbed CO_2 molecules and the Lewis basic amine functionalities decorating the pores.