Efficient CO_2 Capture by Porous Carbons Derived from Coconut Shell

(Supporting information)

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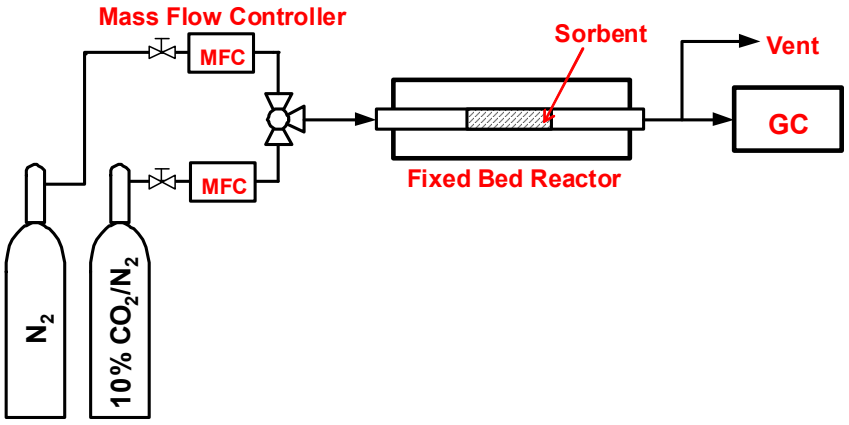

Figure S1. Schematic of the fixed-bed reactor system.

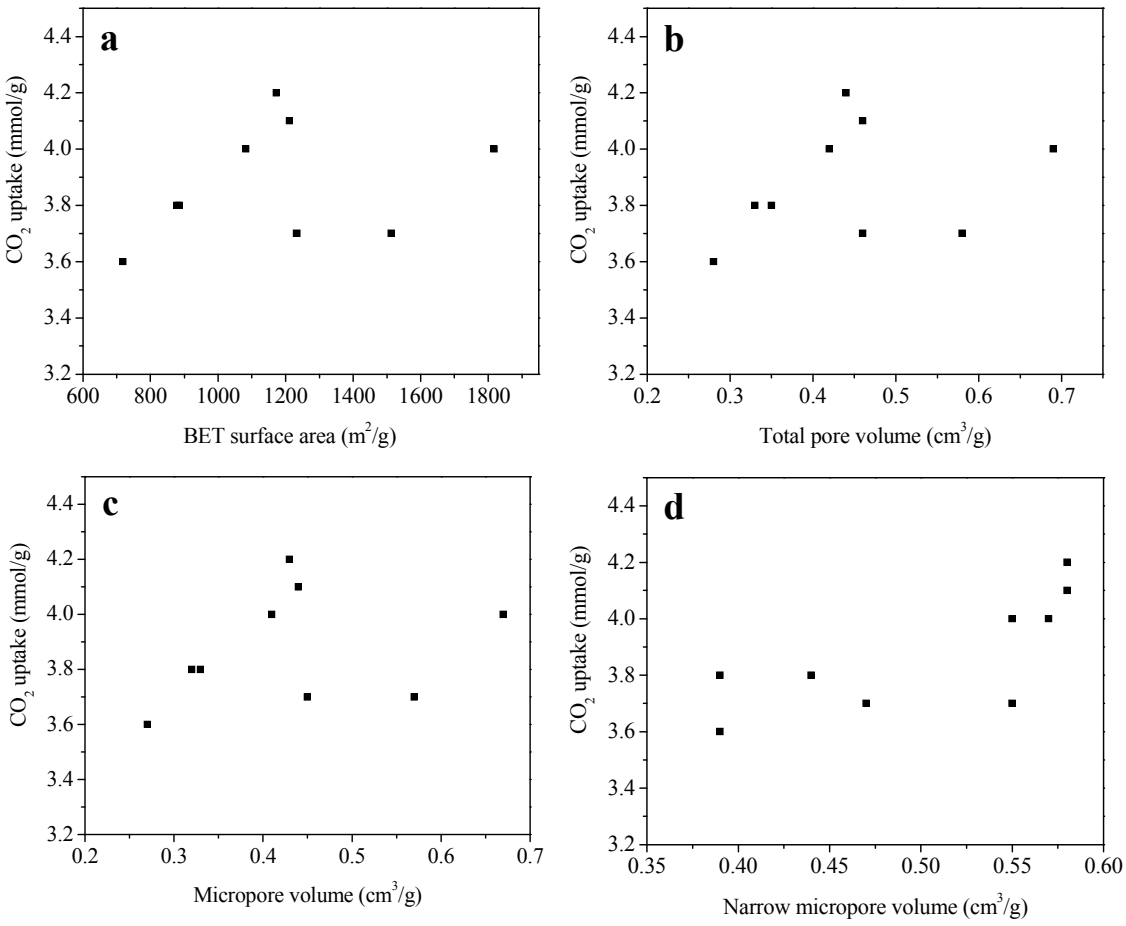

Figure S2. Plot of each porous properties characteristics (a) BET surface area, (b) total pore volume, (c) micropore volume and (d) narrow micropore volume versus CO_2 uptake.

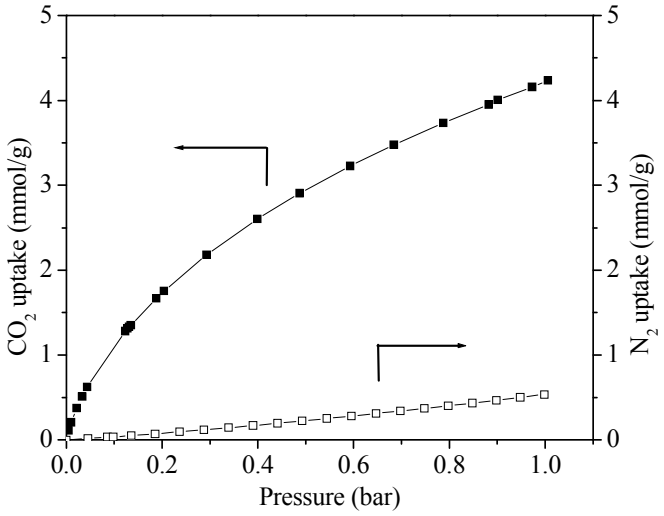

Figure S3. CO_2 (filled symbols) and N_2 (empty symbols) adsorption isotherms of C-600-3 at 25 °C.

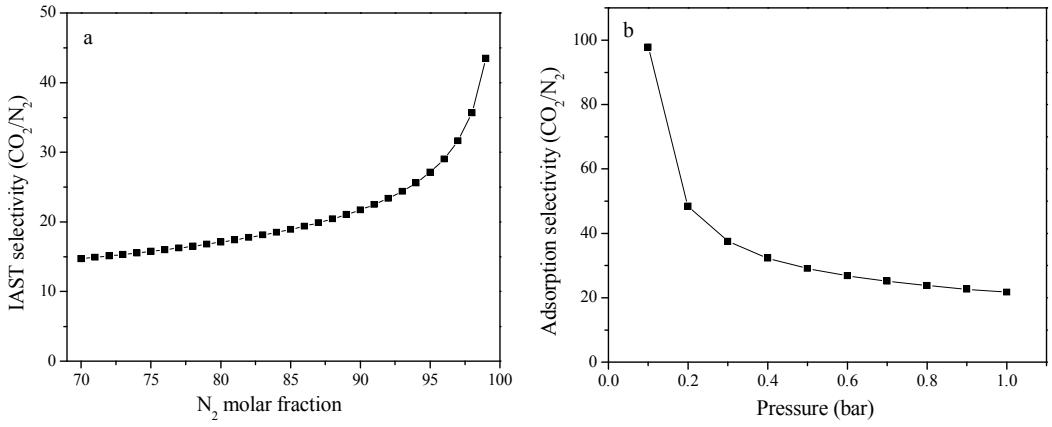

Figure S4. (a) CO_2/N_2 selectivity versus N_2 molar fraction with the overall pressure of 1 bar. The calculations were based on single-component gas adsorption data (at 25 °C) by the IAST method and (b) the IAST-predicted adsorption selectivity for a binary mixture of 10 : 90 CO_2/N_2 at 25 °C and 1 bar.

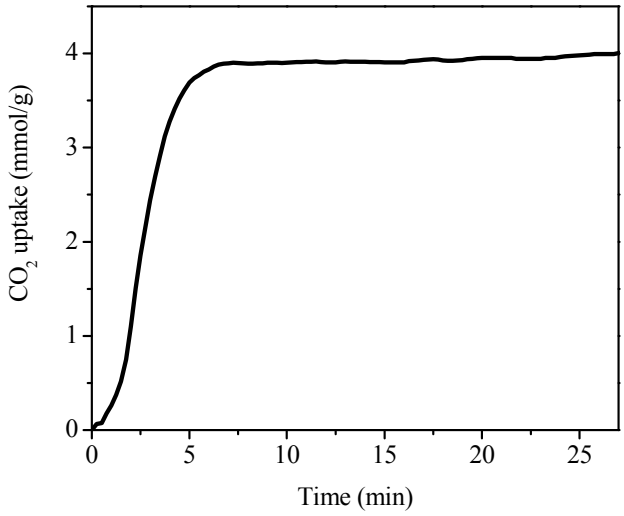

Figure S5. Adsorption kinetic of CO_2 at 25 ºC for C-600-3.

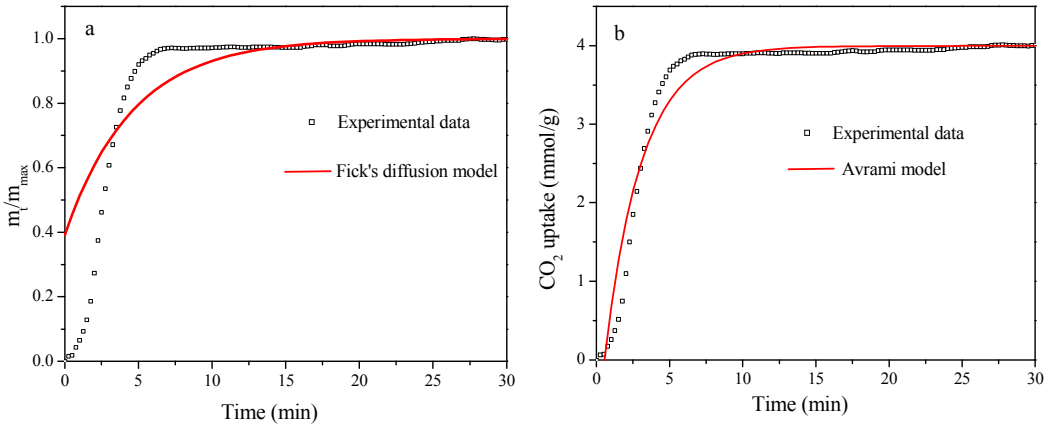

Figure S6. (a) Fick's diffusion model and (b) Avrami's fractional-order kinetic model on experimental CO_2 uptake of C-600-3

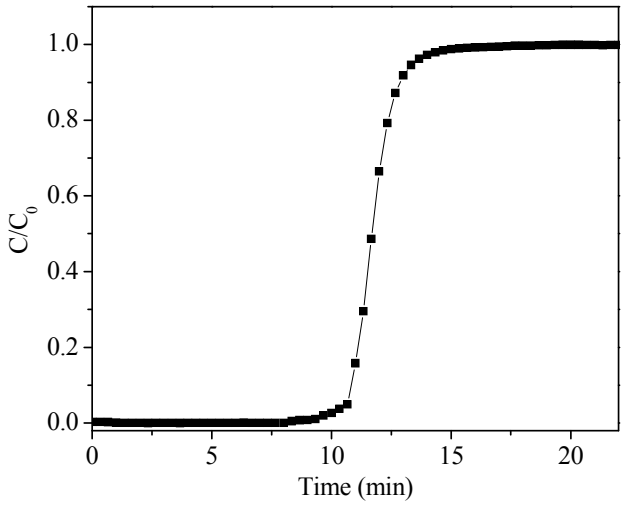

Figure S7. Breakthrough curve of C-600-3 (adsorption at 25°C, gas flow rate: 10 mL/min, inlet CO_2 concentration: 10 vol.%).

Table S1. Comparison of the CO_2 adsorption (25 °C at 1 bar) for porous carbons obtained from different biomass materials.

Carbon source	CO_2 uptake (mmol/g)	Ref.
Oliver stone	2.4	49
Fungi	3.5	37
Almond shell	2.7	46
Microalgae	1.4	48
Coffee ground	3.0	47
Palm shell	3.4	50
Corncob	3.6	51
Glucose	4.1	52
Oil palm bunch	3.7	53
Coconut shell	2.0	36
Coconut shell	3.9	35
Coconut shell	4.2	This study