Activation and Adsorption Performance of Sewage Sludge Carbon for CO_2: Unusual Enhancement Effect of HF Treatment

(Supporting Information)

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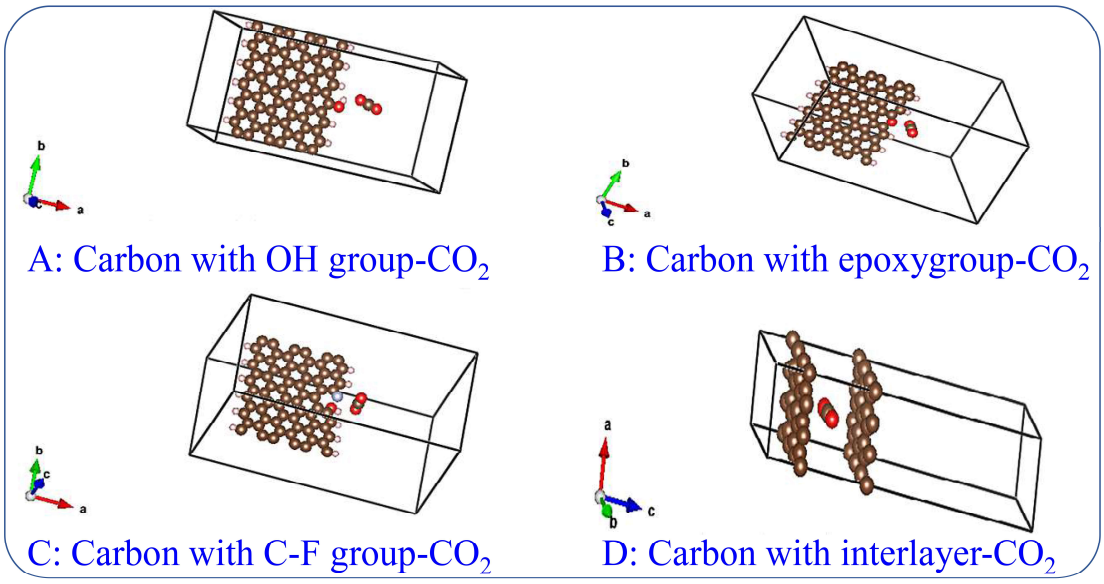

Figure S1. CO_2 adsorption models of the expanded interlayer space-type ultra-micropores and typical functional groups (brown: carbon atom, red: oxygen atom, and grey: fluorine atom)

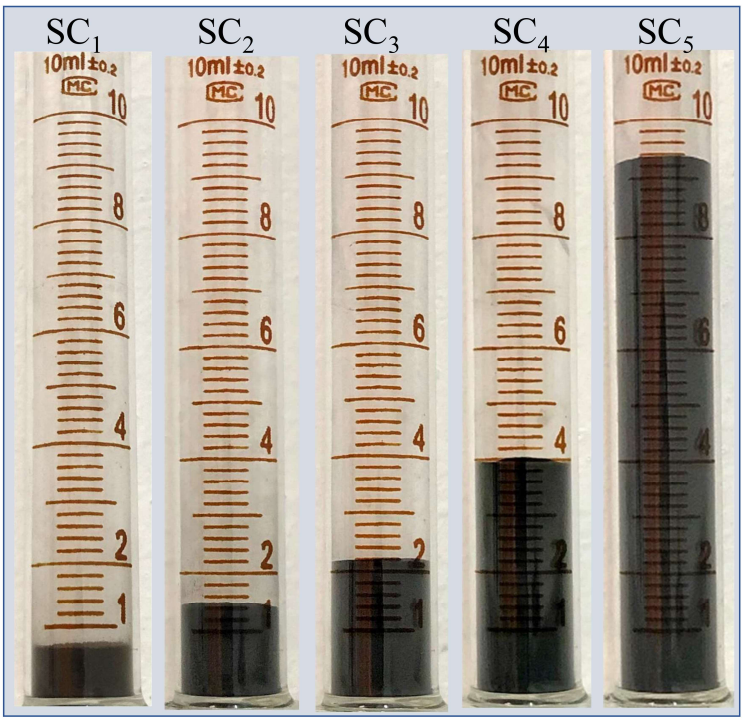

Figure S2. Photos showing packing density differences of five sludge carbons (1 g)

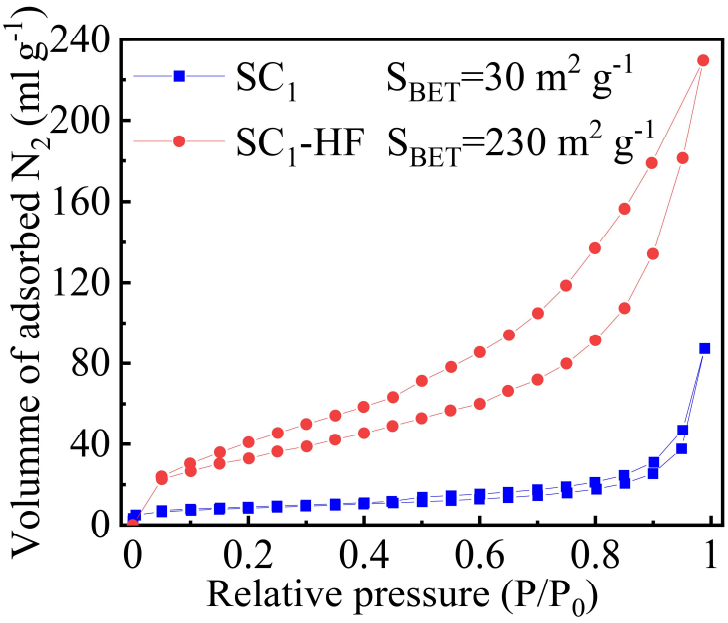

Figure S3. N_2 adsorption-desorption isotherms of SC_1 and SC_1- HF treatment

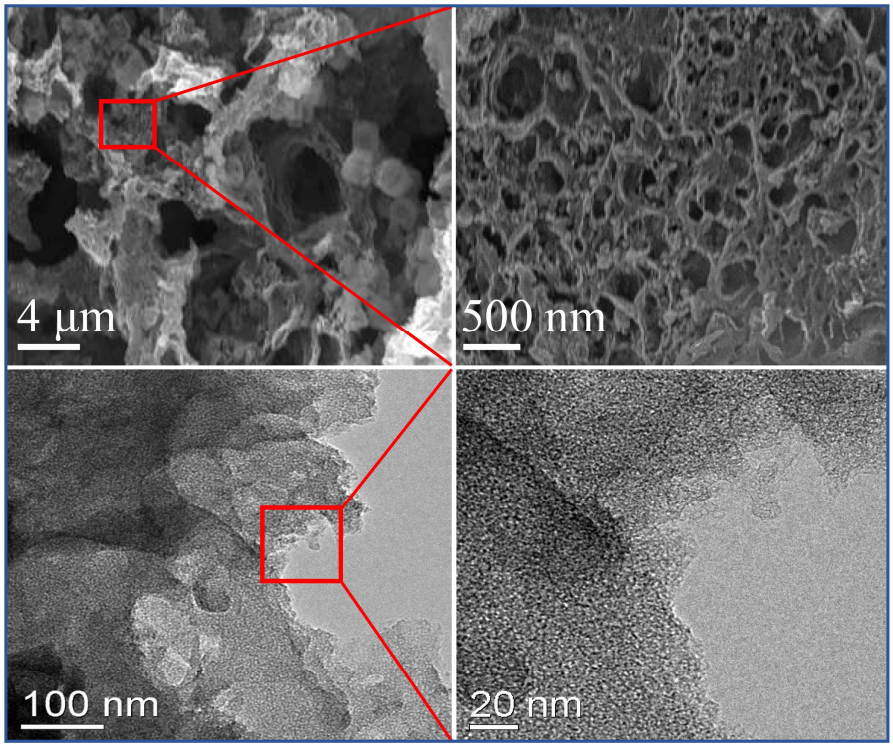

Figure S4. Hierarchically porous textures (SEM and HRTEM) of SC_5 surface

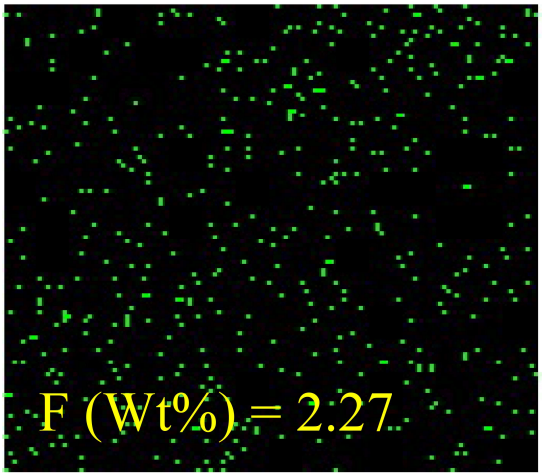

Figure S5. F mapping of SC_5

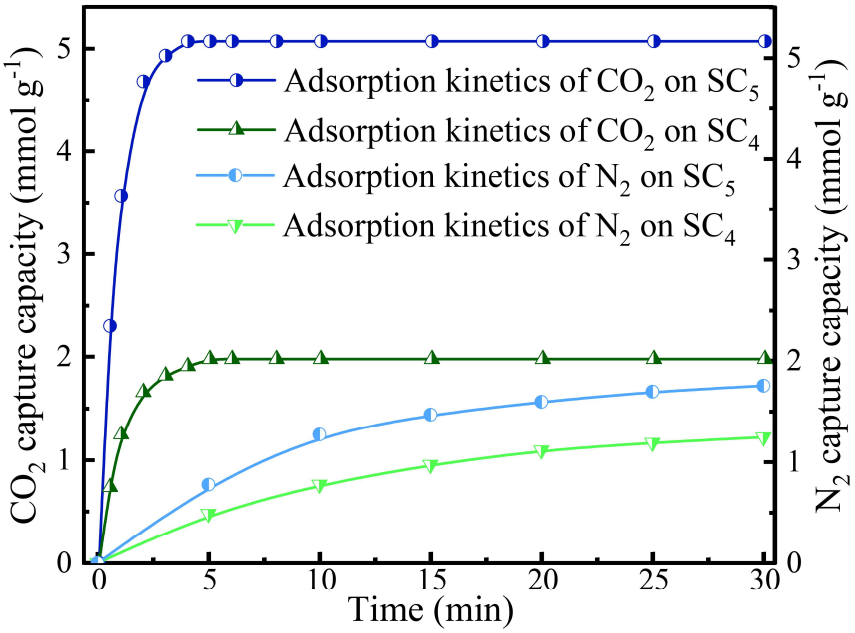

Figure S6. Adsorption selectivity of SC_4 and SC_5 for CO_2 and N_2 (adsorption condition: 25 °C, 1 bar)

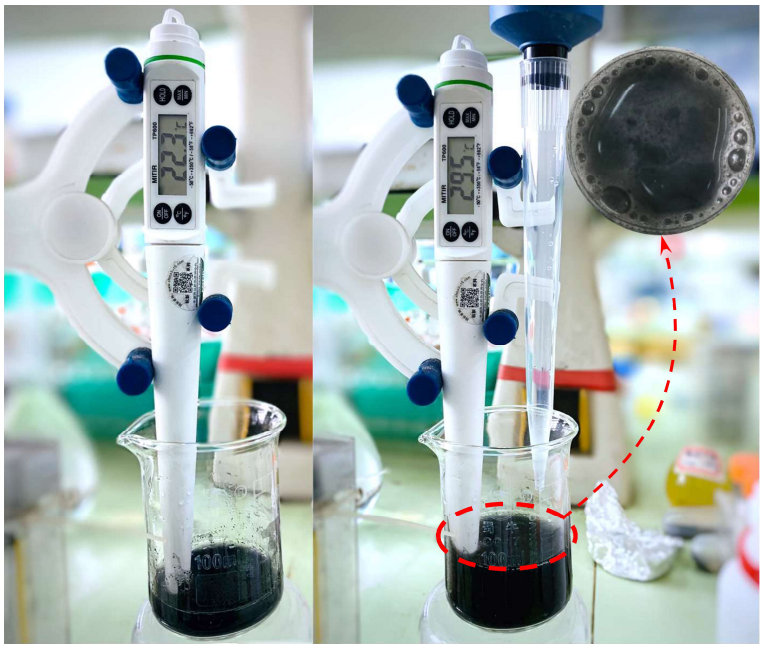

Figure S7. The temperature of sludge carbon-containing suspended slurry before and after adding HF

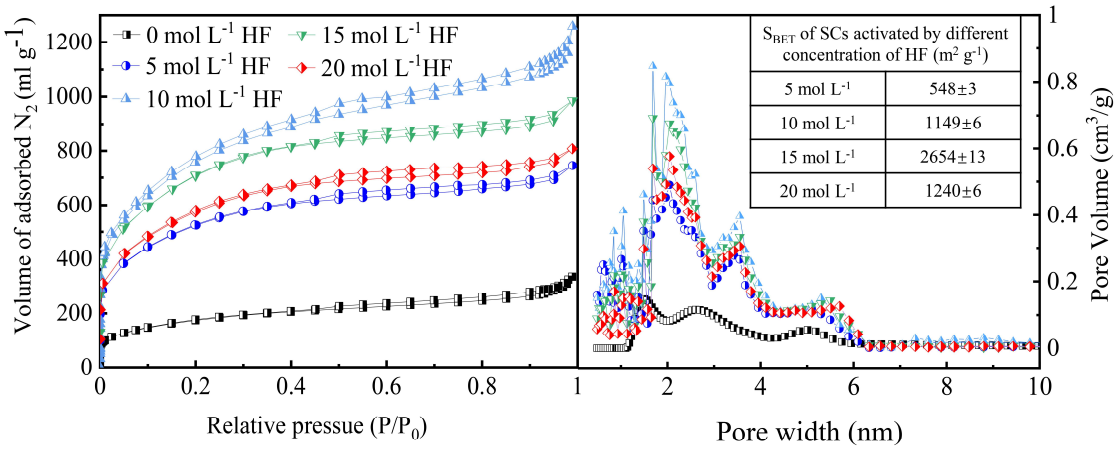

Figure S8. N_2 adsorption-desorption isotherms and Pore size distribution of SCs activated by different concentration of HF (insert table: BET specific surface area)

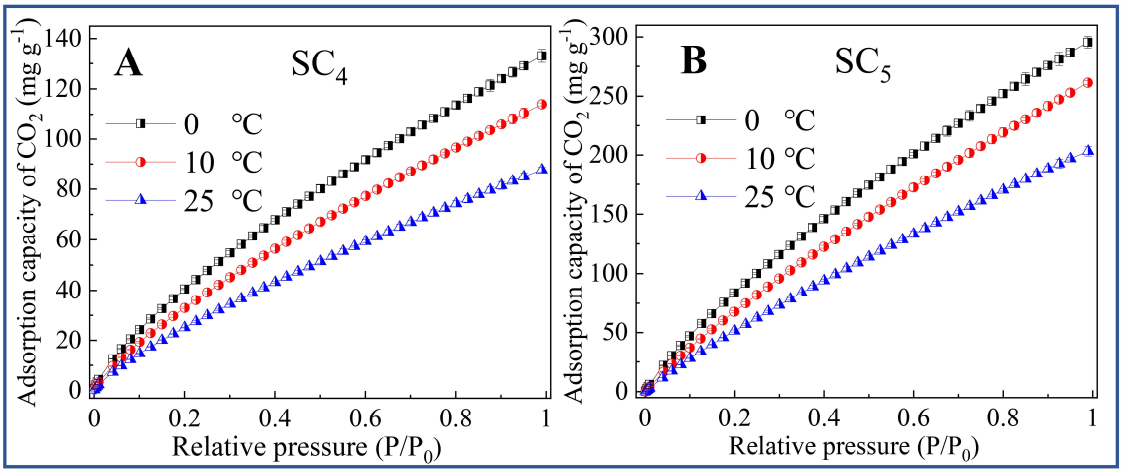

Figure S9. Adsorption isotherms of CO_2 on SC_4 and SC_5 at different temperatures

Table S1. CO_2 adsorption capacities of various carbon materials (25 °C, 1 bar)

Adsorbents	S_{BET} (m^2 g^{-1})	CO_2 Adsorption Capacity (mmol g-1)	Refs.
Crab shell carbon	1196	4.4	S1
Chestnut carbon	747	2.3	S2
Rice husk carbon	2695	3.7	S3
Olive stones carbon	1215	3.1	S4
African palm shell carbon	1890	4.4	S5
Camellia Japonica carbon	3537	2.8	S6
Fern leaves carbon	1593	4.1	S7
Arundo donax carbon	3298	2.2	S8
Celtuce leave carbon	3404	4.4	S9
Pine nut shell	1486	5.0	S10
Mesoporous carbon	1020	2.1	S11
AC (from Fuchen Chem. Reagent Co.)	860	1.2	*
SC_5	2654	4.9	*

* These data were obtained from this study.

References

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