

Supporting Information

Thermal defluorination behaviors of PFOS, PFOA and PFBS during regeneration of activated carbon by molten salt

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Supporting Information Content:

5 pages (including the cover page),

3 Figures,

1 Table

The table of physical and chemical properties of each molten salt.

Table S1. Physical and chemical properties of each molten salt

Name	Molecular weight	Density (g/cm ³)	Melting point (°C)	Boiling point (°C)	Remark
NaOH	40	2.13	318.4	1390	-
Na ₂ SO ₄	142.04	2.68	884	1404	-
Na ₂ CO ₃	105.99	2.532	851	1600	Decomposed under 1744°C
NaCl	58.44	2.165	801	1465	-

Activated carbon loss rate and regeneration efficiency under various regeneration times.

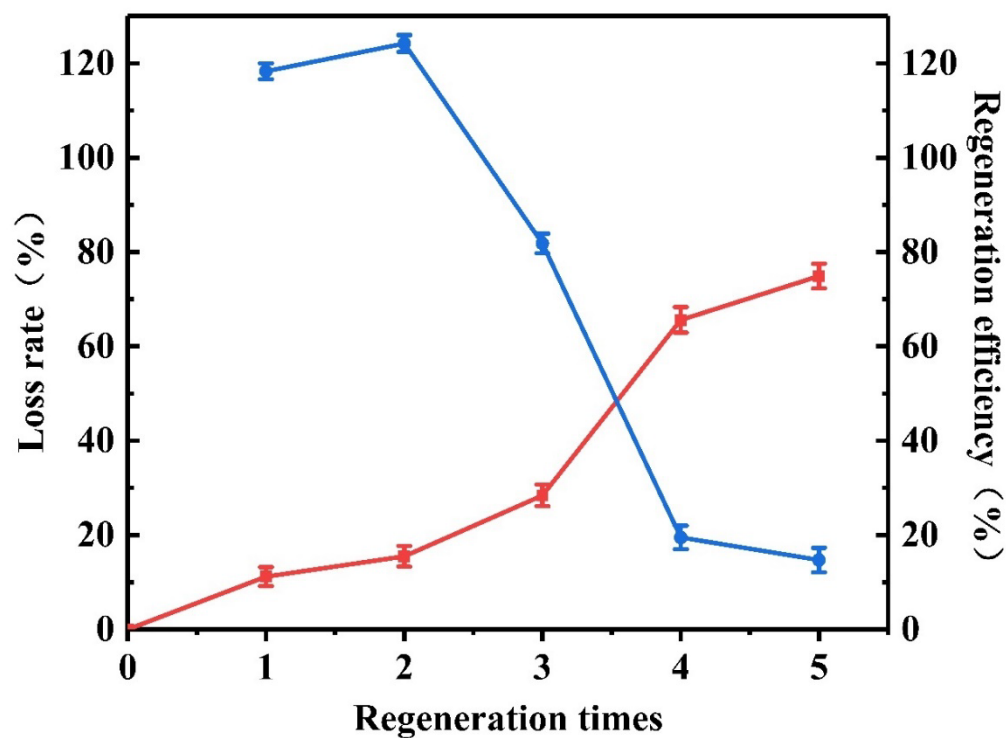


Figure S1. Carbon loss rate (red line) and regeneration efficiency (blue line) under different regeneration times.

Activated carbon cycle adsorption-regeneration experimental method.

In the experiment, PFOS was selected as the adsorbate, NaOH was used as the molten salt medium, and the previous adsorption-molten salt was repeated under the optimal defluorination conditions of the molten salt temperature of 600°C, the holding time of 15 minutes and the carbon-salt ratio of 1:5. The defluorination experiment measures the loss rate of regenerated carbon. The regenerated carbon loss rate φ is as in formula;

$$\varphi = (M_0 - M) / M_0 \quad (1)$$

where M_0 is weight of activated carbon before regeneration (g), M is the weight of activated carbon after regeneration (g).

Regeneration efficiency experimental method.

Put 25mg of regenerated carbon in a 100mL Erlenmeyer flask, then add 50mL of 800mg/L methylene blue solution to it, shake at a constant temperature of 30°C, 150r/min for 10h, and finally dilute the supernatant and measure it at a wavelength of 665nm Absorbance. The regeneration efficiency was evaluated using following equation;

$$q = (C_0 - C) V/M \quad (2)$$

$$\lambda = q_1/q_0 \quad (3)$$

where q is the adsorption value of MB solution (mg/g); C_0 is the initial concentration of MB solution (mg/L); C is the concentration of MB solution after adsorption equilibrium (mg/L); V is the volume of MB solution (L); M is the adsorption experiment The amount of activated carbon used (g); q_1 is the MB solution adsorption value of regenerated carbon (mg/g); q_0 is the MB solution adsorption value of the original activated carbon (mg/g).

FTIR of activated carbon under different regeneration times.

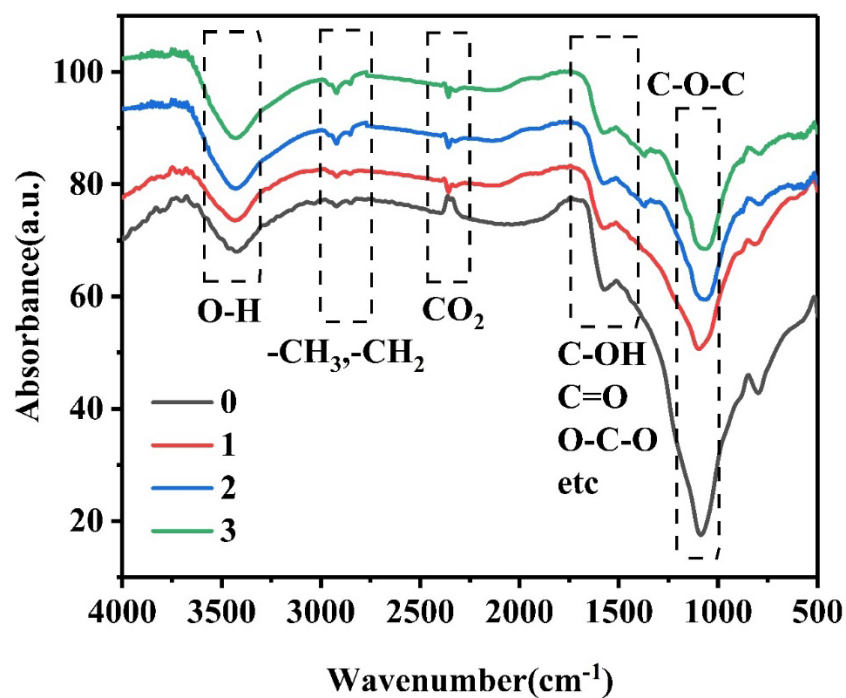


Figure S2. FTIR of activated carbon under different regeneration times.

SEM images of activated carbon before and after regeneration.

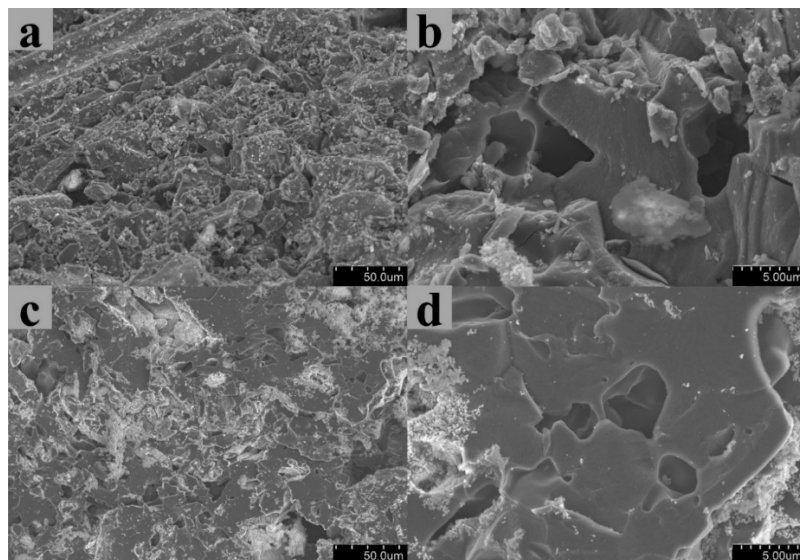


Figure S3. SEM images of untreated AC (a, b) and AC treated with molten sodium hydroxide at 600 °C (c, d).