

Supporting Information for the Article:

Efficient Removal of Tetracycline by Metal-Organic Framework ZIF-67 and Its Mechanism

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Mapping and EDS

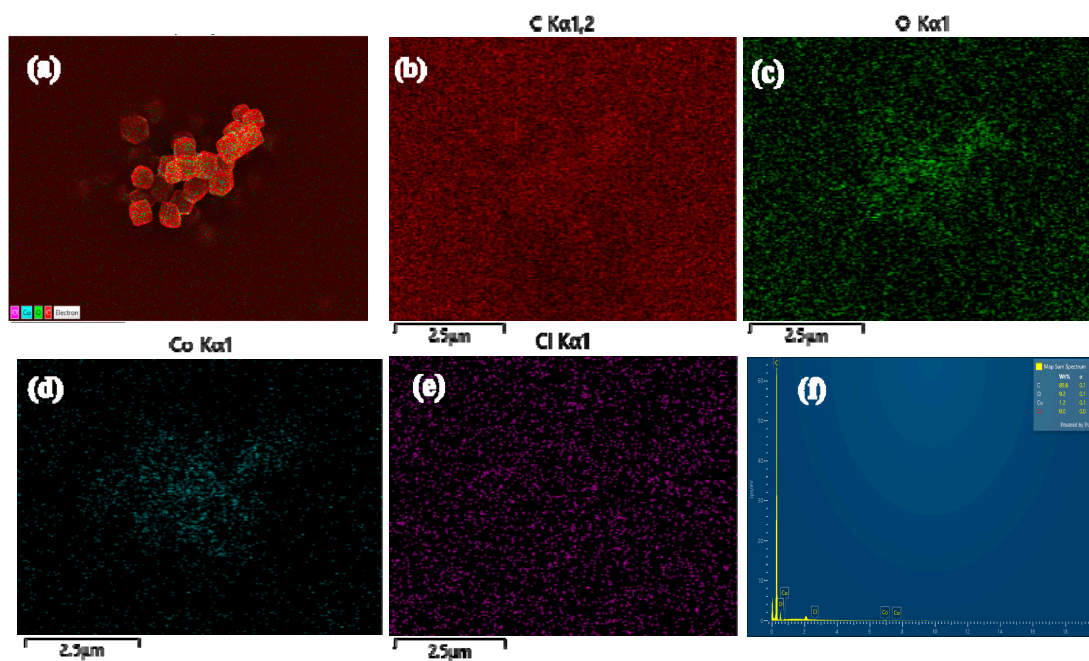


Figure S1 (a)-(f) Mapping plots and EDS plots of ZIF-67.

FiStudy of minimum adsorbent dosage

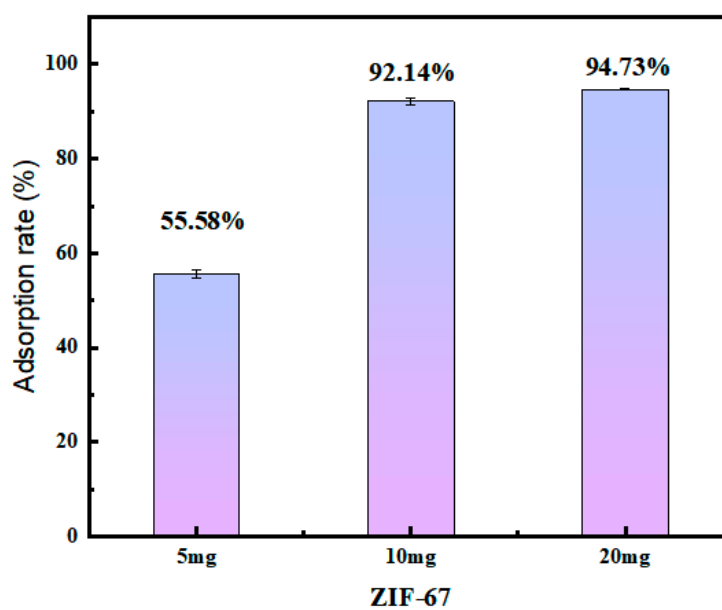


Figure S2. Effect of adsorbent dosage on removal rate (pH=4.5, 25°C, C_{tc} =50mg/L)

The results showed that the removal of tetracycline was increasing with the increase of adsorbent dosage .The removal rate of adsorbent dosage of 20mg is not much different from that of adsorbent of 10mg, so the minimum adsorbent dosage is 10mg.

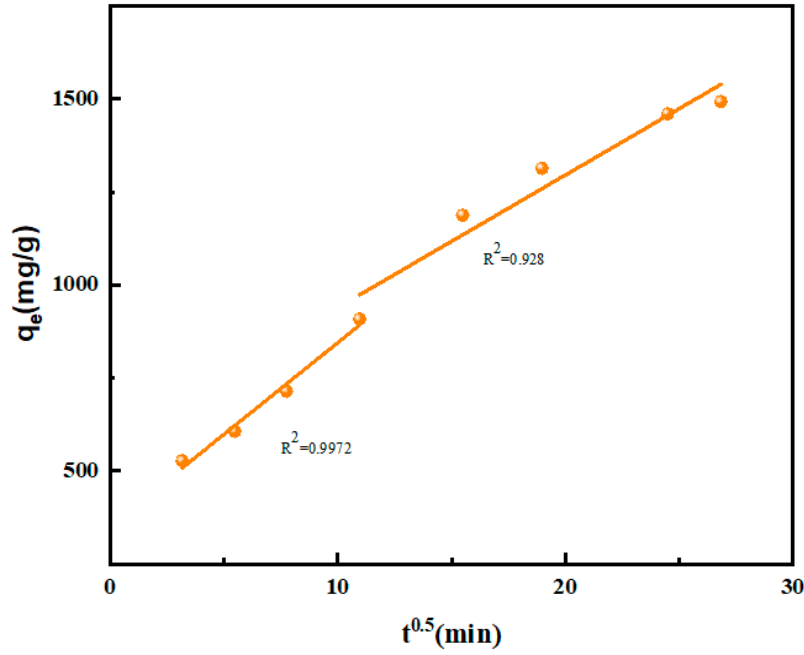


Figure S3. Intra particle diffusion model

Thermodynamic analysis

The thermodynamics and spontaneity of the adsorption of ZIF-67 to TC were studied using changes in the standard free energy (ΔG), entropy (ΔS), and enthalpy (ΔH), calculated as Eq^[1]:

$$K = \frac{q_e}{c_e} \quad (1)$$

$$\ln K = \Delta S/R - \Delta H/(RT) \quad (2)$$

$$\Delta G = \Delta H - T\Delta S \quad (3)$$

q_e is the apparent adsorption of the adsorbent to the adsorbate at adsorption equilibrium, and c_e is the equilibrium concentration ($\text{mol} \cdot \text{L}^{-1}$). Plotting $\ln K$ against $1/T$, the slope and intercept of the line ΔH and ΔS are derived from Eq. (2). Combine with Eq. (3) to calculate ΔG at different temperatures^[2].

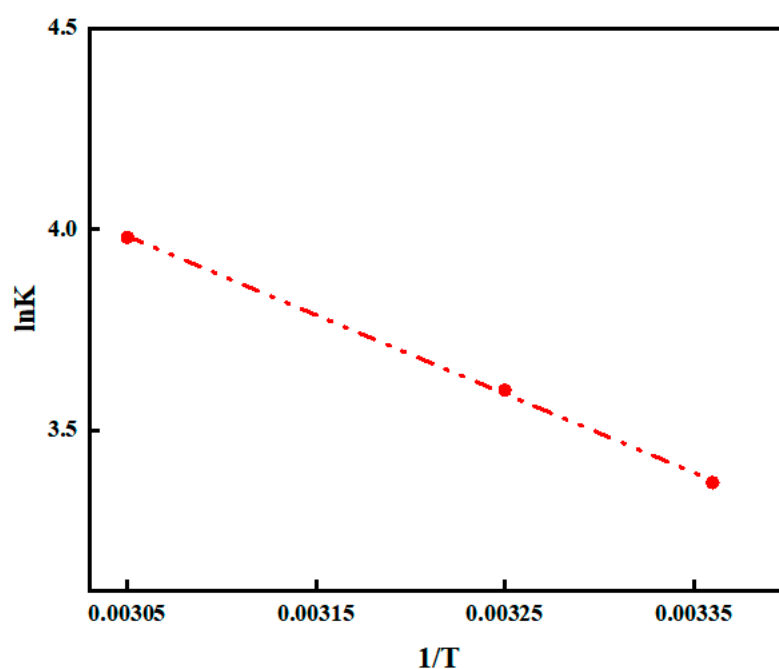


Figure S4. Effect of temperature on adsorption equilibrium constant

Table S1. Thermodynamics of TC adsorption on ZIF-67

T (°C)	$\Delta G^\circ (\text{kJ} \cdot \text{mol}^{-1})$	$\Delta H^\circ (\text{kJ} \cdot \text{mol}^{-1})$	$\Delta S^\circ (\text{kJ} \cdot \text{mol}^{-1})$
298K	-8.126	16.3	0.082
308K	-9.551		
308K	-10.047		

References

- [1] ZHAO J, GAO F, SUN Y, et al. New use for biochar derived from bovine manure for tetracycline removal [J]. Journal of Environmental Chemical Engineering, 2021, 9(4): 105585.

- [2] JAIN C K. Adsorption of zinc onto bed sediments of the River Ganga: adsorption models and kinetics [J]. Hydrological Sciences Journal, 2001, 46(3): 419-34.