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Supplementary Information

Polypyrrole modified magnetic reduced graphene oxide nanocomposites：Synthesis, characterization and its application for highly selective lead adsorption

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Chart and Chart description

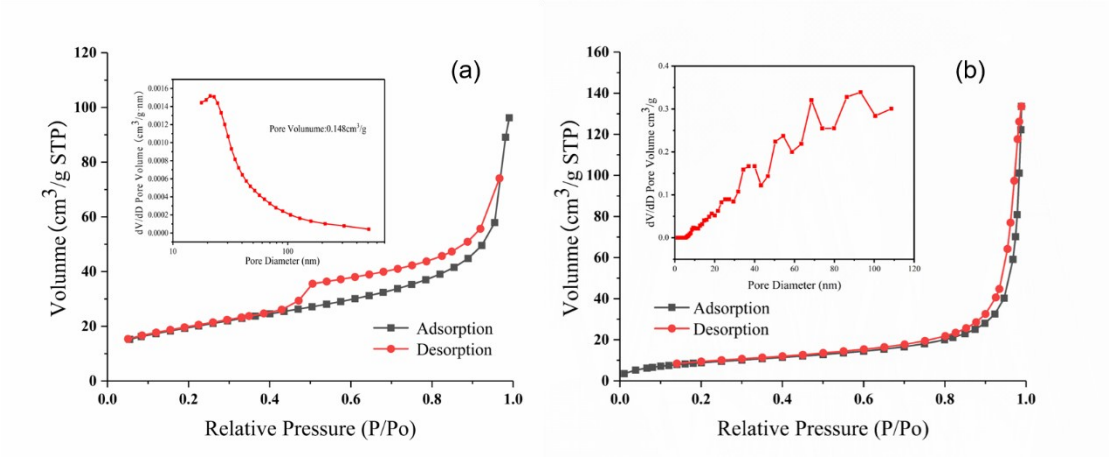

Fig. S1 N_2 adsorption-desorption isotherms of Fe_3O_4/rGO (a) and PPy-FG (b); the corresponding BJH adsorption pore distributions curve (inset).

Tab. S1 Description of the kinetic models

Kinetic models	Equations	Parameters description
Pseudo-first-order	$q_t = q_e(1 - e^{-K_1 t})$	q_t is the adsorption capacity of the adsorbent at time t, t (min) is the contact time, q_e is the adsorption capacity at equilibrium, K_1 (min^{-1}) and K_2 (g/mg·min) are the rate constants
Pseudo-second-order	$q_t = \frac{q_e^2 K_2 t}{1 + q_e K_2 t}$	

Tab. S2 Description of the equilibrium isotherm equations

Type	Equations	Parameters description
Langmuir	$q_e = \frac{q_m K_L C_e}{1 + K_L C_e}$	q_e(mg/g) is the equilibrium adsorption capacity, C_e(mg/L) is equilibrium concentration, q_m(mg/g) is the maximum adsorption capacity and K_L(L/mg) is the Langmuir adsorption constant
Freundlich	$q_e = K_F C_e^{1/n}$	K_F (mg/g) is Freundlich affinity coefficient and n is Freundlich constant

Tab. S3 Description of the adsorption thermodynamics equations

Type	Equations	Parameters description
Van't Hoff	$\ln K = \frac{\Delta S^\theta}{R} - \frac{\Delta H^\theta}{RT}$ $K = \frac{q_e}{C_e}$	ΔG^θ (kJ/mol) denotes the change in Gibb's energy, R is the ideal gas constant (8.314J/mol/K), T (K) is the absolute temperature, K (L/g) is thermodynamic equilibrium constant. q_e(mg/g) and C_e(mg/L) are the equilibrium adsorption capacity and equilibrium concentration at temperature T, respectively. ΔH^θ (kJ/mol) and ΔS^θ (kJ/mol/K) are the changes in enthalpy and entropy, respectively. The ΔH° and ΔS° values are calculated from the slope and intercept of the linear plot of $\ln K$ versus 1/T.
Gibbs free energy	$\Delta G^\theta = \Delta H^\theta - T\Delta S^\theta$	