

A Selective, Efficient, Facile, and Reusable Natural Clay/Metal Organic Framework as a Promising Adsorbent for the Removal of Drug Residue and Heavy Metal Ions

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Figure S1. Calibration curve for Sildenafil detection using UV-VIS spectrophotometer.

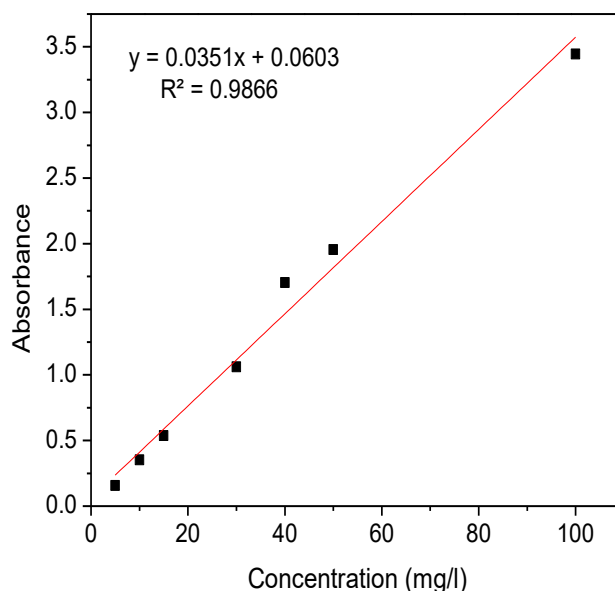


Table S1. Isotherm models investigated in this study.

Langmuir isotherm model	$q_e = q_{\max} \frac{K_L C_e}{1 + K_L C_e}$ <p>where C_e (mg/L) is the equilibrium aqueous-phase concentration of adsorbate, q_e (mg/g) is the quantity of adsorbed substances, q_{\max} (mg/g) is the maximum adsorption capacity, and K_L (L/mg) is the Langmuir constant related to the adsorption rate.</p>	(1)
Freundlich isotherm model	$q_e = K_f C_e^{1/n}$	(2)

	where K_f is the Freundlich constant that provides data concerning the adsorption capacity of adsorbed particles onto an adsorbent surface, and n is the Freundlich constant. $1/n$ provides information regarding surface heterogeneity and adsorption intensity.	
Langmuir–Freundlich isotherm	$qe = \frac{q_{MLF}(K_{LF}C_e)^{MLF}}{1+(K_{LF}C_e)^{MLF}},$ <p>where q_{MLF} is the Langmuir–Freundlich maximum adsorption capacity (mg/g), K_{LF} is the constant of a heterogeneous solid at equilibrium, and MLF represents the heterogeneity parameter.</p>	(3)
Sips isotherm model	$qe = \frac{q_{max}K_s C_e^{1/n}}{1+K_s C_e^{1/n}},$ <p>where q_{max} is the adsorption capacity (mg/g), K_s is the Sips constant attached to adsorption energy, and $1/n$ is the sips isotherm exponent.</p>	(4)
Toth isotherm model	$qe = \frac{K_e C_e}{(1+K_L C_e^n)^{1/n}},$ <p>where K_L and n are Toth isotherm constants (mg/g).</p>	(5)
Temkin isotherm model	$q = \left(\frac{RT}{b_t}\right) \ln A_t + \left(\frac{RT}{b_t}\right) \ln C_e,$ <p>where A_t is the equilibrium binding constant (L/mg), b_t is the Temkin heat of the adsorption constant, R represents the gas constant, and T represents the temperature of the system.</p>	(6)
Redlich–Peterson isotherm model	$qe = \frac{K_R C_e^{1/n}}{1+a_R C_e^\beta},$ <p>where β is an exponent, and K_R (L/g) and a_R (L/mg) are Redlich–Peterson isotherm constants.</p>	(7)
Kahn isotherm model	$qe = \frac{Q_m b_K C_e}{(1+b_K C_e)^{a_K}},$ <p>where a_K is the Kahn isotherm model exponent, b_K is the Khan isotherm model constant, and Q_m is the Khan isotherm maximum adsorption capacity (mg/g).</p>	(8)
Fritz–Schlunder isotherm model	$qe = \frac{q_{mFSS} K_1 C_e^{m_1}}{1+K_2 C_e^{m_2}},$ <p>where q_{mFSS} is the Fritz–Schlunder maximum adsorption capacity (mg/g), and K_1, K_2, m_1, and m_2 are Fritz–Schlunder parameters.</p>	(9)

Table S2. Adsorption kinetics equations investigated for non-linear regression of kinetic data.

Model	Description	
Pseudo first-order [94]	$q_t = q_e(1 - e^{-K_1 t}),$ <p>where q_t is the adsorption capacity (mg g⁻¹) at time t (min), q_e is the adsorption capacity (mg g⁻¹) at equilibrium, and k_1 is the pseudo first-order rate constant (min⁻¹).</p>	(S10)
Pseudo second-order [95]	$q_t = \frac{q_e^2 K_2 t}{1+q_e K_2 t},$ <p>where k_2 is the pseudo second-order rate constant (min⁻¹).</p>	(S11)
Intraparticle diffusion [96]	$q_t = K_{ip} \sqrt{t} + C_{ip},$ <p>where k_{ip} is the measure of the diffusion coefficient (mg g⁻¹ min^{-1/2}), and C_{ip} is the interparticle diffusion constant (mg g⁻¹).</p>	(S12)
Mixed 1- and 2-order model [97,98]	$q_t = q_e \frac{1 - \exp(-kt)}{1 - f_2 \exp(-kt)},$ <p>where f_2 is the mixed 1,2 order coefficient, and k is the adsorption rate constant (mg g⁻¹ min⁻¹).</p>	(S13)
Avrami model [99]	$q_t = q_e(1 - \exp(-K_{av} t)^{n_{av}}),$ <p>where k_{av} is the Avrami rate constant (min⁻¹), and n_{av} is the Avrami component.</p>	(S14)