Supporting Information

Adsorptive Removal of Ciprofloxacin by Ethylene Diaminetetraacetic Acid/β-cyclodextrin Composite from Aqueous Solution

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1. Adsorption kinetic models

The pseudo-first-order model is as follows:

$$\log\left(q_e - q_t\right) = logq_e - k_1 t$$

where q_t and q_e (mg/g) are the amount of CPX adsorbed per unit mass of adsorbent at any time t (min) and equilibrium, respectively. k_1 (min^{-1}) is the rate constant of pseudo-first-order model.

The pseudo-second-order kinetic model is as follows:

$$\frac{t}{q_t} = \frac{1}{k_2\, q_e^2} + \frac{1}{q_e} t$$

where k_2 (g/mg min) is the rate constant of pseudo-second-order model.

2. Adsorption isotherm models

The nonlinear forms of Langmuir and Freundlich models were expressed as follows:

$$q_e = \frac{q_m\, k_l\, c_e}{1 + k_l c_e}$$

$$q_e = K_f + C_e^{\frac{1}{n}}$$

where C_e and q_e are the concentrations of adsorbate in water and the amount of adsorbate adsorbed to adsorbent when the adsorption equilibrium is reached, respectively. q_m is the maximum adsorption capacity, and K_l is Langmuir constant (L/mg) related to the energy of adsorption and the affinity of the binding sites . Moreover, K_f are Freundlich constant, also known as capacity factor related to adsorption capacity ($(mg\ g^{-1})(L\ mg^{-1})^{1/n}$) . 1/n related to adsorption intensity, which is a dimensionless empirical parameter.

In order to adequately study the adsorption mechanisms, the linear Dubinin Radushkevich (D-R) isotherm model was chosen and exhibited as follows:

$$lnq_e = lnq_m - B\varepsilon^2$$

where B is a constant related to the mean free energy of adsorption ($mol^2\ kJ^{-2}$), qm is the theoretical saturation capacity (mg g-1), and ε is the Polanyi value , which can be calculated from eq 7:

$$\varepsilon = RTln(1 + \frac{1}{c_e})$$

where R (J mol^{-1} K^{-1}) is thermal equilibrium constant and T(K) is the absolute temperature.