Supplementary Information

Novel Porous Organic Polymer for High Performance Pb(II) Adsorption from Water: Synthesis, Characterization, Kinetic, and Isotherm Studies

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Text S1. Kinetics isotherm

Three widely used nonlinear kinetic models namely; pseudo-first-order (PFO) Equation 1 [1], pseudo-second-order (PSO) Equation 2, and Elovich models Equation 3 [2] were applied to assessment of the kinetic mechanism for Pb(II) adsorption onto TPABPOP-1.

$$q_t = q_e(1 - e^{-k_1 t}) \quad (1)$$

$$q_t = \frac{q_e^2 k_2 t}{1 + q_e k_2 t} \quad (2)$$

$$q_t = \frac{1}{\beta}\ln(1 + \alpha\beta t) \quad (3)$$

where qe and qt are the adsorption capacities (mg/g) at equilibrium and at time t (min), respectively; k1 and k2 the constants for PFO and PSO models, respectively, α (mg/g min) is the initial adsorption rate; β (mg/g) is the desorption constant during any one experiment.

Text S2. Isotherms isotherm

Three widely used nonlinear isotherm models namely, Freundlich Equation 4 [3], Langmuir Equation 5 [4], and Dubinin-Radushkevich (D-R) (Equation 6, 7, and 8) [5] was used to determine the maximum capacity of TPABPOP-1 .

$$q_e = K_F C_e^{1/n} \quad (4)$$

$$q_e = \frac{q_m K_L C_e}{1 + K_L C_e} \quad (5)$$

$$q_e = q_m e^{-K_{D-R}\varepsilon^2} \quad (6)$$

$$\varepsilon = RT\ln(1 + \frac{1}{C_e}) \quad (7)$$

$$E = \frac{1}{\sqrt{2K_{D-R}}} \quad (8)$$

Here, KD-R (mol2/kJ2) is the D-R constant relating to adsorption energy, while KL (L/mg) is the Langmuir binding constant. KF is the Freundlich constant (mg^{1-n}. Ln/g); Ce is the concentration of Pb(II) (mg/L) at equilibrium; n is the heterogeneity factor; E(kJ/mol) is the activation energy, and ε is the Polanyi potential.

References

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