Supplementary Information

Amino-Alcohol functionalized porous polymer coupled with nanoparticles of metal hydroxide for efficient adsorption of Cd(II) from wastewater

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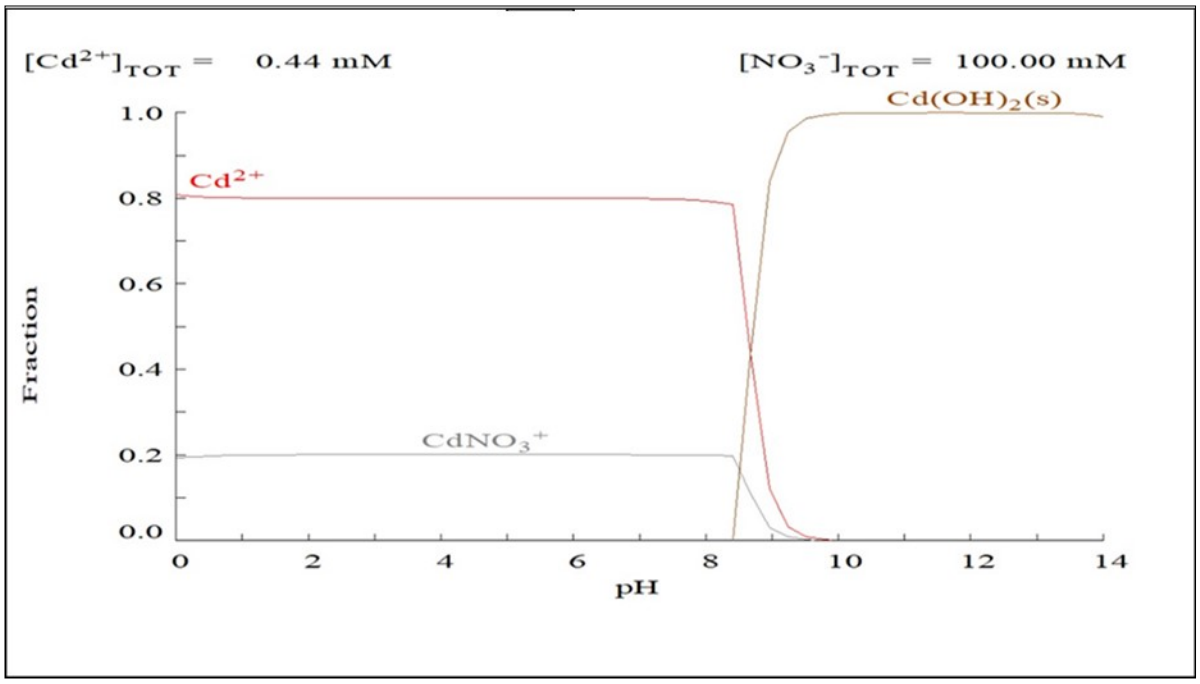

Figure S1: Expected aqueous speciation of metal ion concentration (50 mg L^{-1}) for cadmium as a function of pH using Medusa/Hydra program.

Table S1: *Kinetic, isotherm, and fitting equations for Cd(II) adsorption process* ***[1-8]***.

Kinetics	Equations
Pseudo-first-order	$q_t = q_1\left(1 - e^{-k1t}\right)$
Pseudo-second-order	$q_t = \frac{1}{\left(1 \middle\vert k_2 q_2^2\right) + \left(t \middle\vert q_2\right)}$
Intra-particle diffusion model (IPD)	$q_t = K_{id}\, t^{0.5} + C_i$
Isotherms	**Equations**
Langmuir model	$q_e = \frac{q_m k_L C_e}{1 + k_L C_e}$
Freundlich model	$q_e = K_F C_e^{1/n_F}$
Dubinin-Radushkevich (D_R) model	$ln\, q_e = lnq_S + K_{ad}\varepsilon^2$
Sips model	$q_e = \frac{q_S\left(k_S C_e\right)^{mS}}{1 + \left(k_S C_e\right)^{mS}}$
Fitting	**Equations**
Average relative error (ARE)	$ARE = \frac{100}{n}\sum_1^n \frac{\lvert q_{exp} - q_{pred}\rvert}{q_{exp}}$
Chi-square coefficient (x^2)	$x^2 = \sum\left[\frac{\left(q_{exp} - q_{pred}\right)^2}{q_{pred}}\right]$

qe (mg g^{-1}) is the equilibrium concentration of metal ions, and qt (mg g^{-1}) is the adsorbed amount of metal ions after time t (min), Ce (mg L^{-1}) is equilibrium concentration of metal ions. k_1 (min^{-1}) and k_2 (min^{-1}) are the rate constants for the pseudo first and second order, respectively. K_{id} (mg/g. $min^{0.5}$) is a rate constant, and C is the thickness of the boundary layer. q_m and q_S are the maximum sorption capacity (mg. g^{-1}) of Langmuir and Sips models. k_L (L. mg^{-1}), K_F (L/ mg), $\boldsymbol{K_{ad}}$ (mol^2/J^2), and K_S (L/ mg) are represent the constants of Langmuir, Freundlich, Dubinin–Radushkevich, and Sips models. n refer to the sorption intensity, mS is Sips constant. $\boldsymbol{q_s}$ is the theoretical isotherm saturation capacity (mg/g). The mean sorption energy (E_{DR}) which equals $\left(1/\sqrt{2K_{ad}}\right)$; $\boldsymbol{\varepsilon}$ is Dubinin–Radushkevich isotherm constant and equal ($RT\, ln\left(1 + 1/C_e\right)$ **[6-7]**. AER and x^2 are the relative error and Chi-square coefficients respectively, the number of test points is n, the experimental equilibrium capacity is q_{exp} (mg g^{-1}), while the predicted capacity is q_{pred} (mg g^{-1}).

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Table S2: *The values of the applied Weber and Morris kinetic model parameters*

	PS	EA-PS	Cr@EA-PS
Weber and Morris model			
k_i (mg/g $min^{1/2}$)	0.04	0.05	0.11
C	0.01	0.41	9.28
R^2	0.99	0.99	0.99

Table S3: *Sorption and desorption efficiencies (%) for five successive cycles.*

	Sorption, %	**Desorption, %**
Run #1	93.2	93.4
Run #2	92.8	93.1
Run #3	91.3	92.1
Run #4	90.7	91.3
Run #5	90.1	90.4