

Supporting Information

Kinetics, thermodynamics, equilibrium, surface modelling and atomic absorption analysis of selective Cu(II) removal from aqueous solutions and rivers water using silica-2-(pyridin-2-ylmethoxy)ethan-1-ol hybrid material

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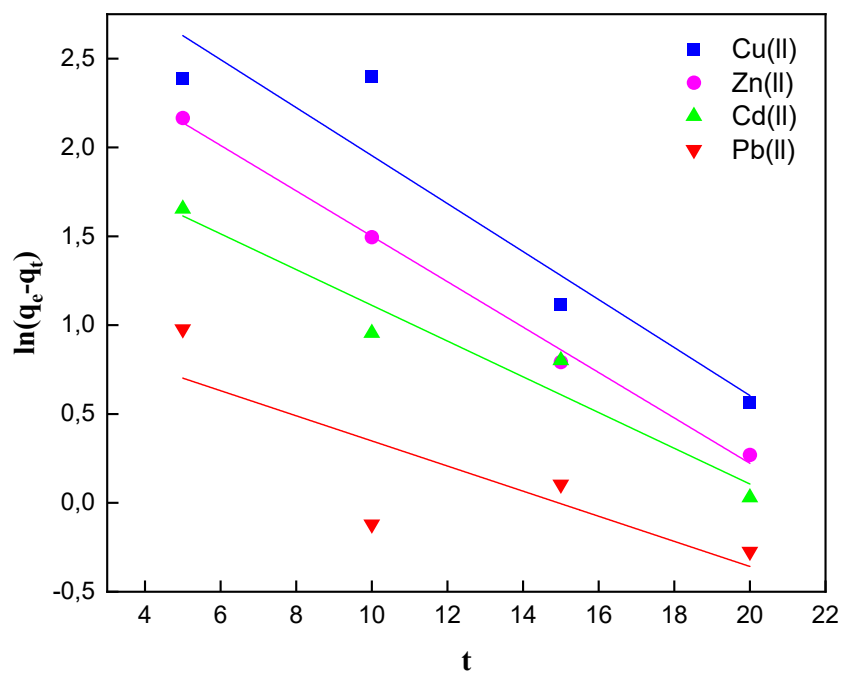


Fig. S1 Kinetic curves of Cu(II), Zn(II), Cd(II) and Pb(II) adsorption rate onto SiPy fitted by pseudo-first-order. Adsorption conditions: $V = 10$ mL, $m = 10$ mg of adsorbent, pH = 6, and optimum concentrations: 180.66 , 140.10 , 99.70 and $95,63 \cdot 10^{-3}$ mg L⁻¹ for Cu(II), Zn(II), Cd(II) and Pb(II) respectively at 25 °C.

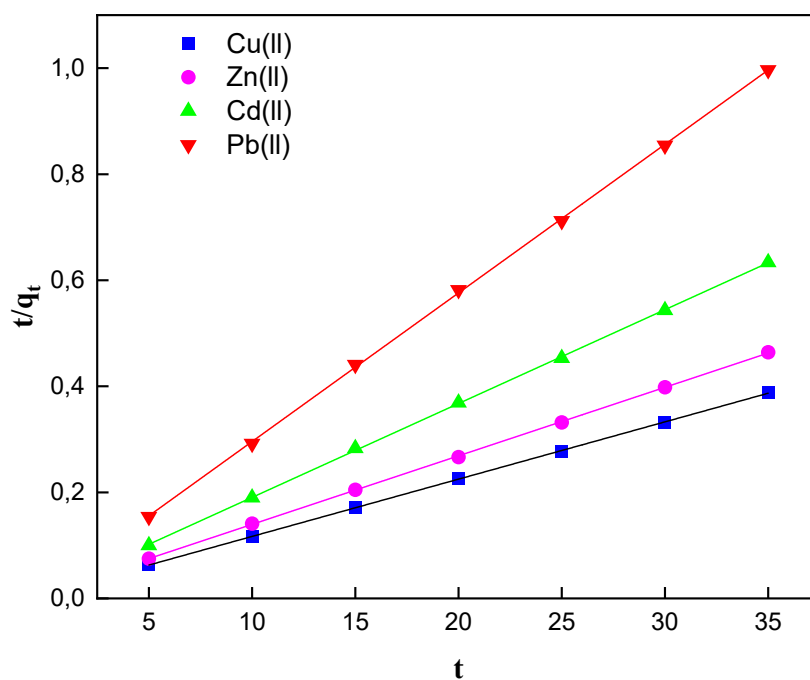


Fig. S2 Kinetic curves of Cu(II), Zn(II), Cd(II) and Pb(II) adsorption rate onto SiPy fitted by pseudo-second-order. Adsorption conditions: $V = 10$ mL, $m = 10$ mg of adsorbent, pH = 6, and optimum concentrations: 180.66, 140.10, 99.70 and 95,63.10⁻³ mg L⁻¹ for Cu(II), Zn(II), Cd(II) and Pb(II) respectively at 25 °C.

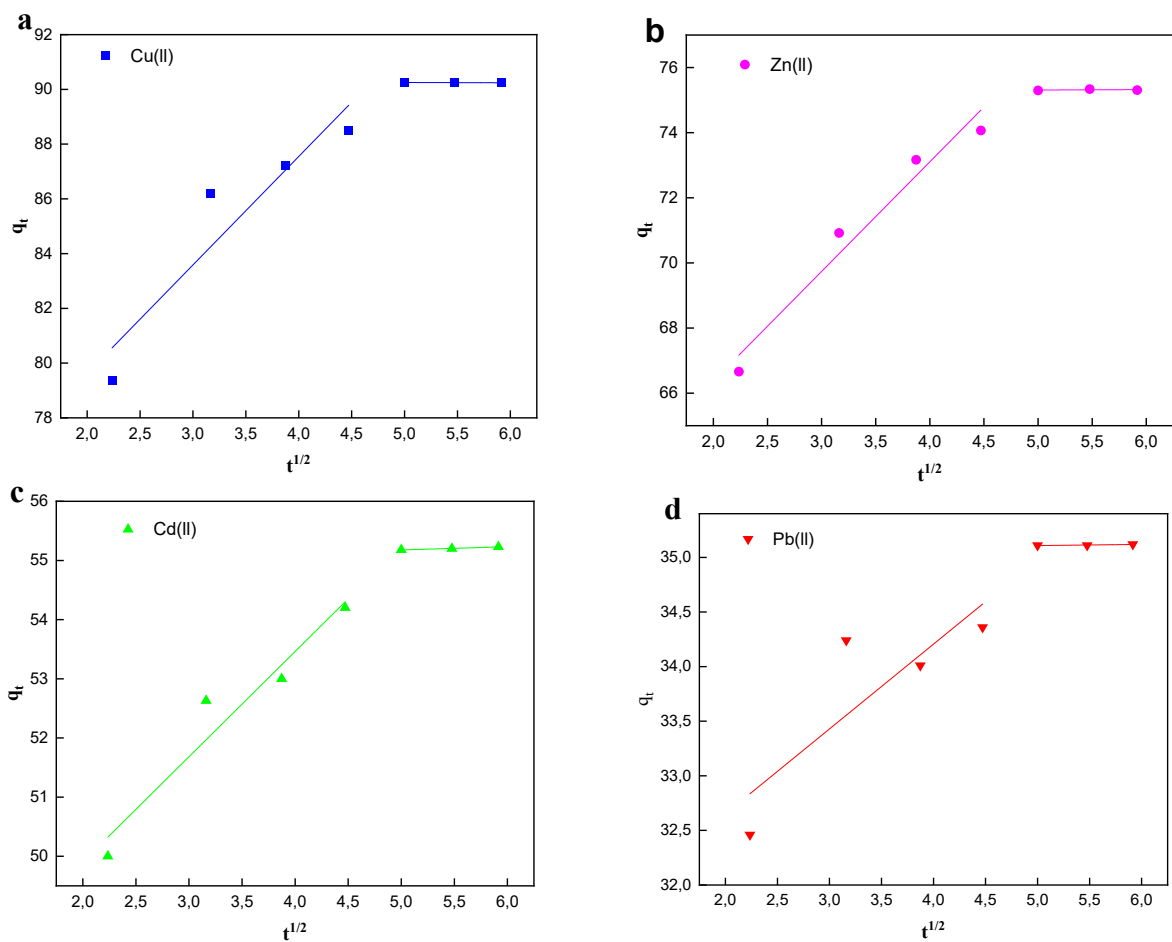


Fig S3a, b, c, d Intra-particle diffusion model (a) copper, (b) zinc, (c) cadmium and (d) lead. Adsorption conditions: $V = 10$ mL, $m = 10$ mg of adsorbent, pH = 6, and optimum concentrations: 180.66 , 140.10 , 99.70 and $95,63 \cdot 10^{-3}$ mg L⁻¹ for Cu(II), Zn(II), Cd(II) and Pb(II) respectively at 25 °C.

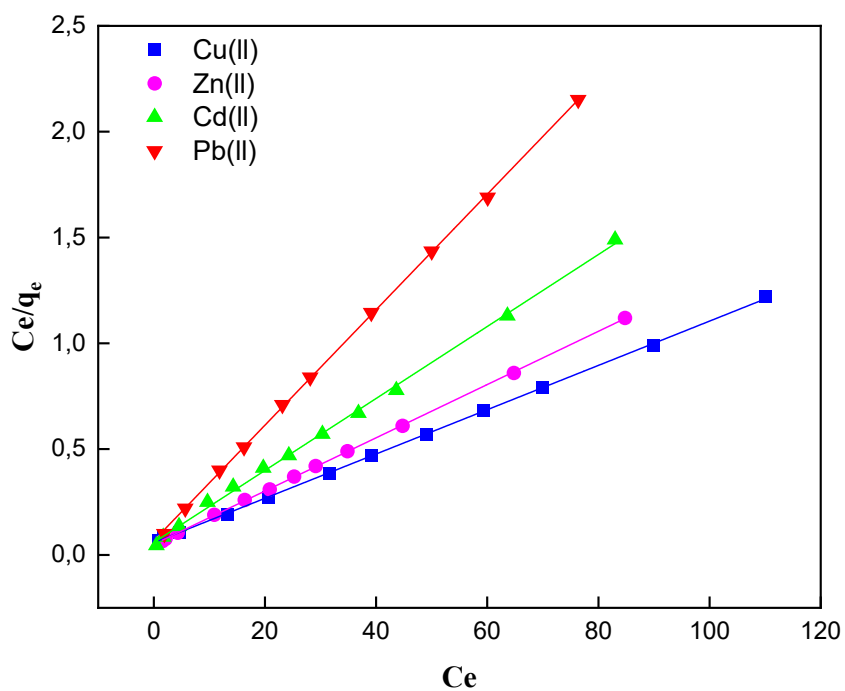


Fig S4 Adsorption isotherms of SiPy towards Cu(II), Zn(II), Cd(II) and Pb(II) fitted by Langmuir. Adsorption conditions: $m = 10$ mg, $V = 10$ mL, $[Mn(II)] = 10$ to $300 \cdot 10^{-3}$ g L $^{-1}$, pH = 6, time = 25 min at 25 °C.

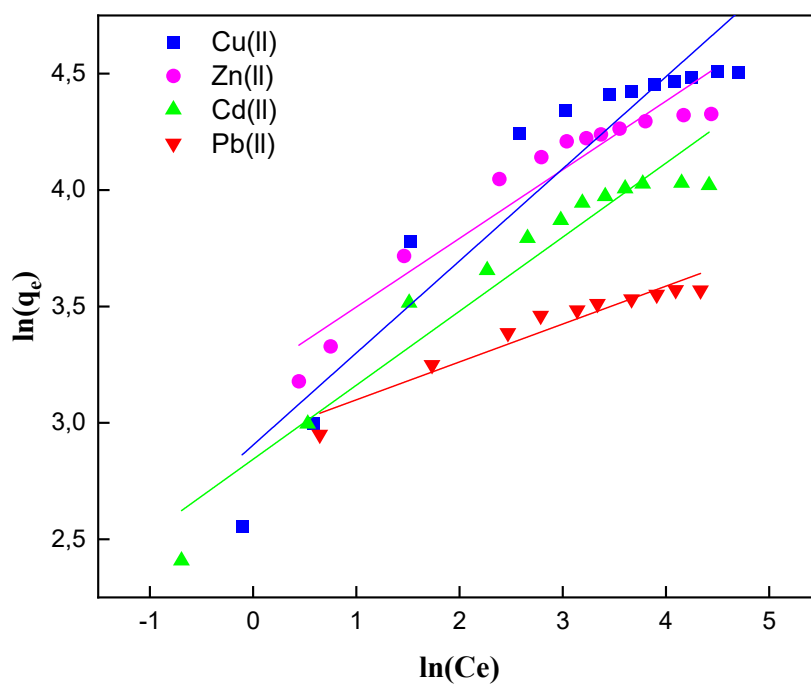


Fig S5 Adsorption isotherms of **SiPy** towards Cu(II), Zn(II), Cd(II) and Pb(II) fitted by Freundlich. Adsorption conditions: $m = 10$ mg, $V = 10$ mL, $[\text{Mn(II)}] = 10$ to $300 \cdot 10^{-3}$ g L $^{-1}$, pH = 6, time = 25 min at 25 °C.

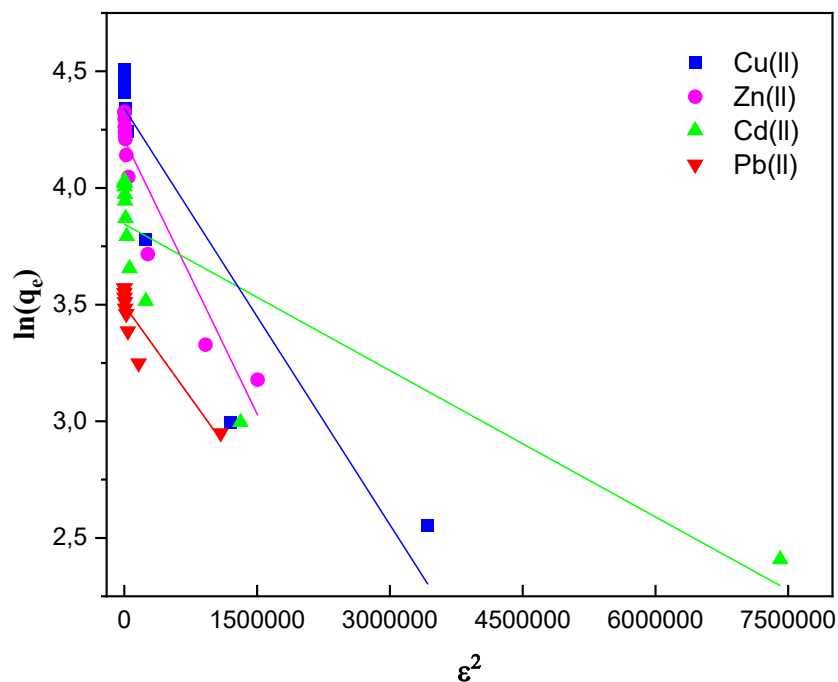


Fig S6 Adsorption isotherms of **SiPy** towards Cu(II), Zn(II), Cd(II) and Pb(II) fitted by Dubinin-Radushkevich (D-R). Adsorption conditions: $m = 10$ mg, $V = 10$ mL, $[\text{Mn(II)}] = 10$ to $300 \cdot 10^{-3}$ g L $^{-1}$, pH = 6, time = 25 min at 25 °C.

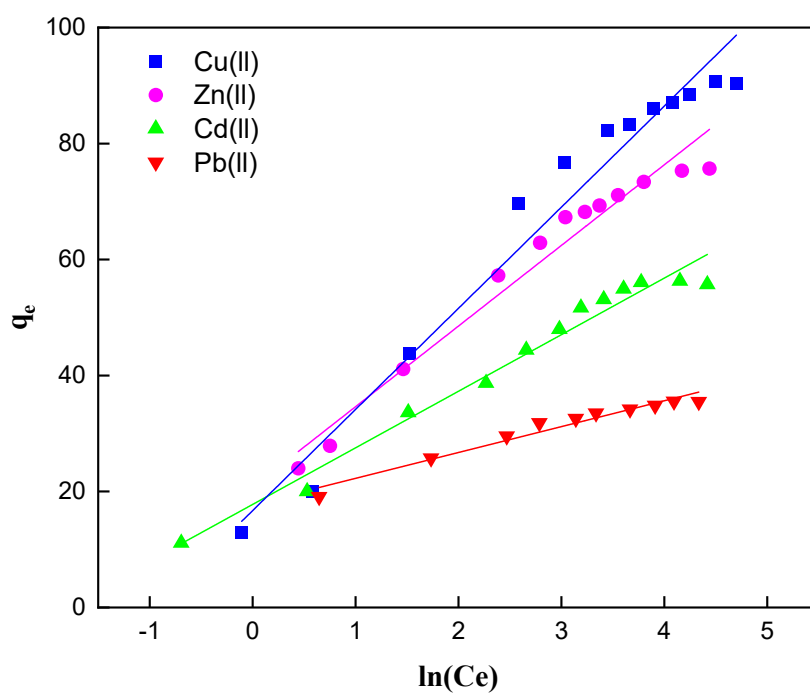


Fig S7 Adsorption isotherms of SiPy towards Cu(II), Zn(II), Cd(II) and Pb(II) fitted by Temkin. Adsorption conditions: $m = 10$ mg, $V = 10$ mL, $[Mn(II)] = 10$ to $300 \cdot 10^{-3}$ g L $^{-1}$, pH = 6, time = 25 min at 25 °C.