

Adsorption of Phenolic Compounds onto Reusable $\text{CeO}_2@\text{SiO}_2$ Nanocomposites:
Kinetics, Equilibrium, and Thermodynamics in Batch and Column Systems

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Supplementary Information

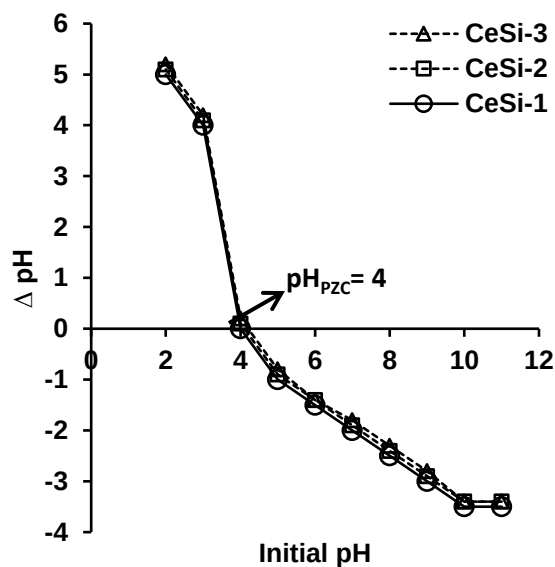


Figure S1. The representative graph for the determination of point of zero charge (pH_{pzc}) for the $\text{CeO}_2\text{-SiO}_2$ nanoadsorbents.

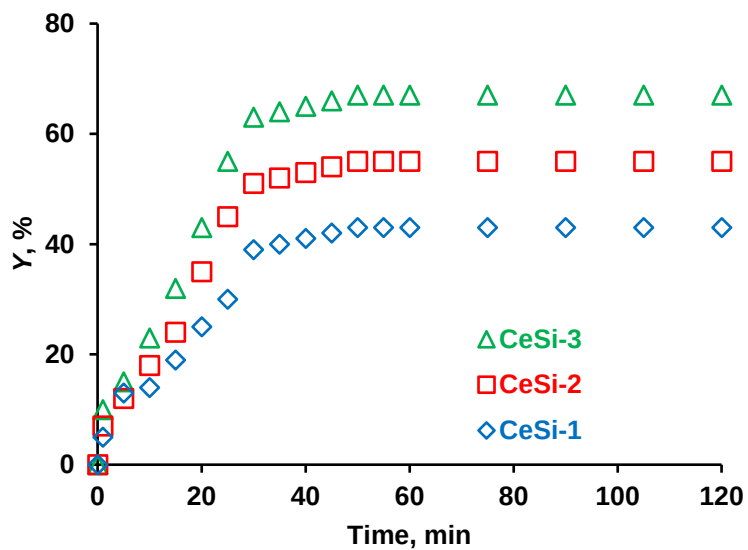


Figure S2. Influence of contact time on the adsorption efficiency of phenol by using $\text{CeO}_2\text{-SiO}_2$ (initial phenol concentration: 100 mg/L, adsorbent dose: 1.5 g/L, pH: 3, and T : 298 K).

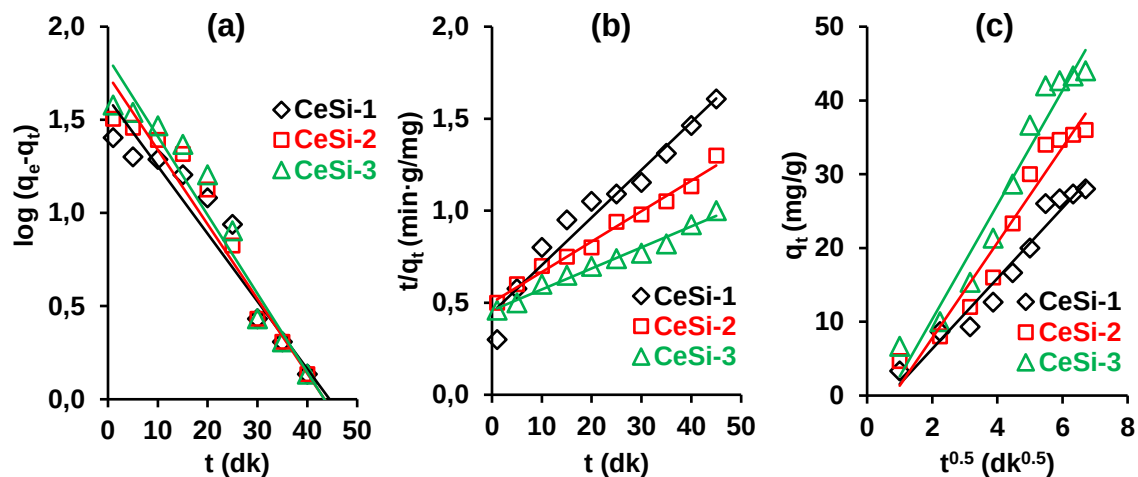


Figure S3. Plots of the (a) Pseudo-first-order kinetic model, (b) pseudo-second-order kinetic, and (c) intraparticle diffusion model for the adsorption of phenol using $\text{CeO}_2\text{-SiO}_2$ adsorbents (initial phenol concentration: 100–500 mg/L, adsorbent dose: 0.5–2.5 g/L, pH: 3, and T : 298 K).

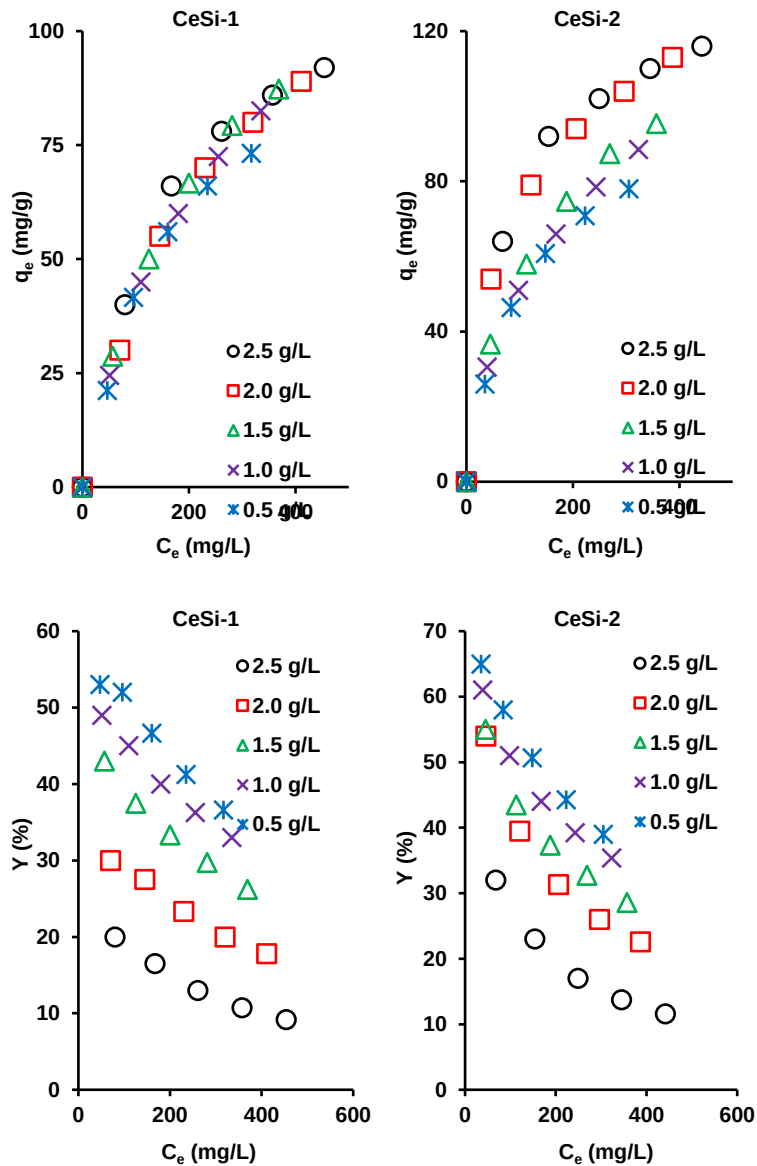


Figure S4. Effect of initial phenol concentration and adsorbent dosage on adsorption capacity and efficiency of phenol using CeSi-1 and CeSi-2 adsorbents (initial phenol concentration: 100–500 mg/L, adsorbent dose: 0.5–2.5 g/L, pH: 3, t : 60 min, and T : 298 K).

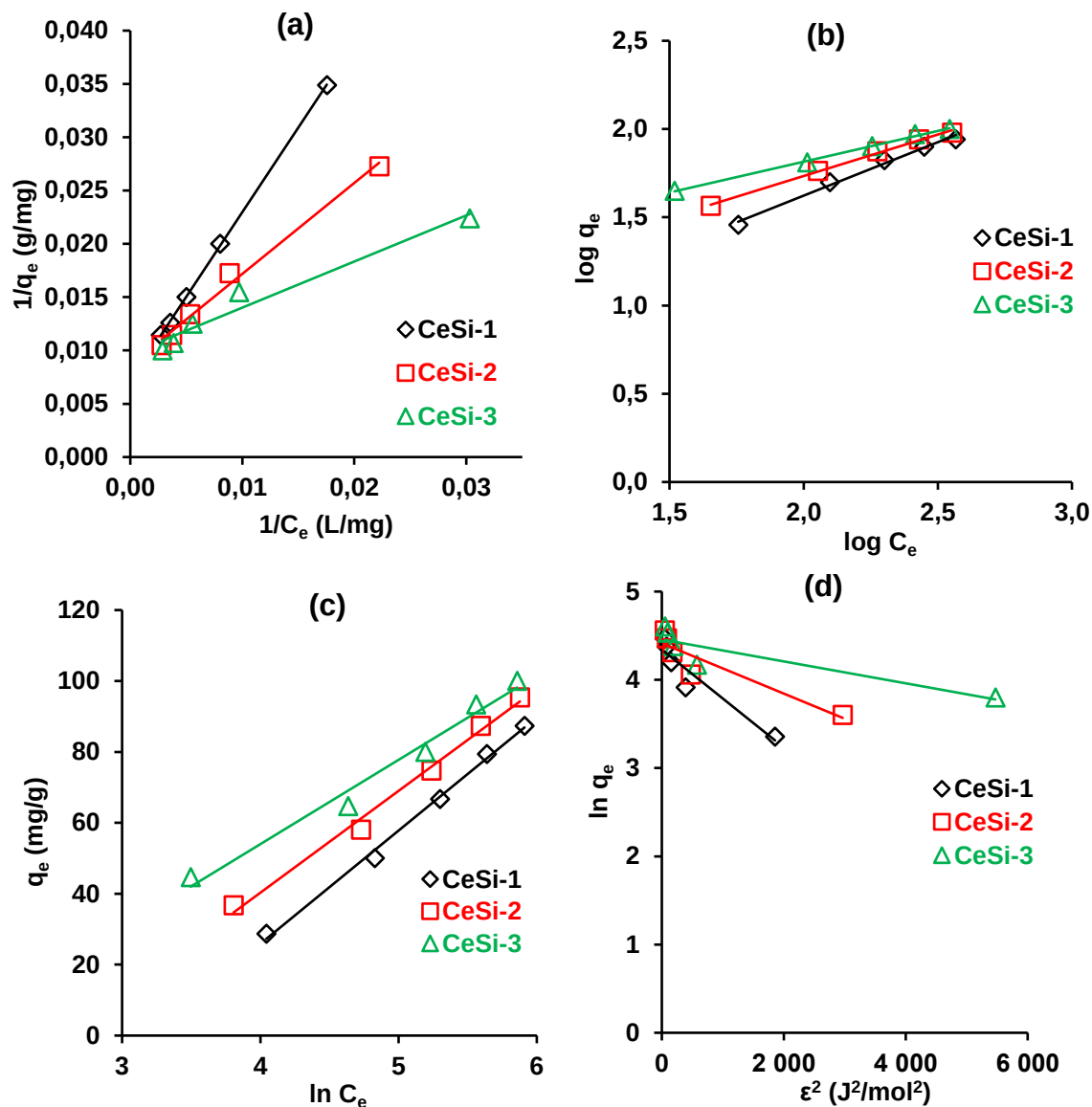


Figure S5. (a) Langmuir, (b) Freundlich, (c) Temkin, and (d)

Dubinin–Radushkevich isotherm models fitting with experimental data of CeO₂–SiO₂ adsorbents for the adsorption of phenol (initial phenol concentration: 100–500 mg/L, adsorbent dose: 1.5 g/L, pH: 3, t : 60 min, and T : 298 K).

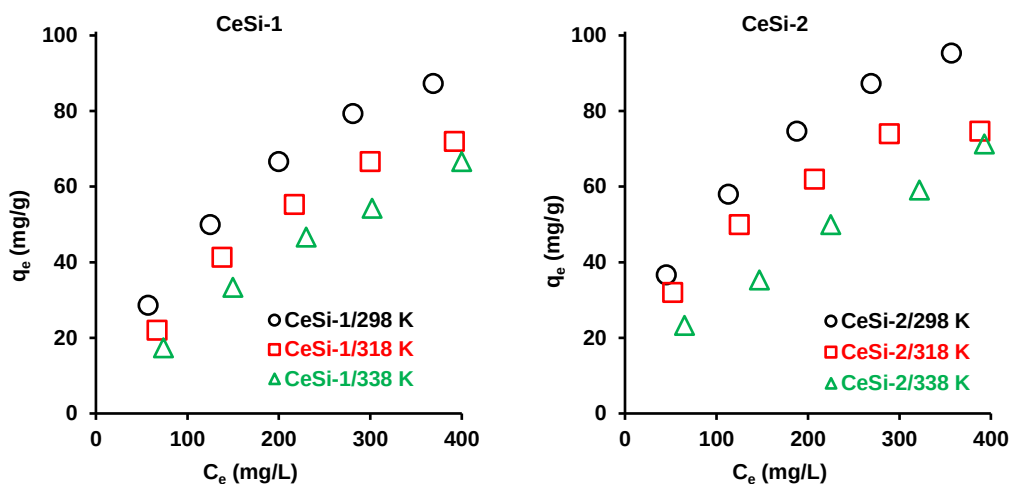


Figure S6. Effect of temperature on the adsorption capacity of phenol onto $\text{CeO}_2\text{-SiO}_2$ adsorbents (for CeSi-2 and CeSi-3) (initial phenol concentration: 100–500 mg/L, adsorbent dose: 1.5 g/L, pH: 3, and t : 60 min).