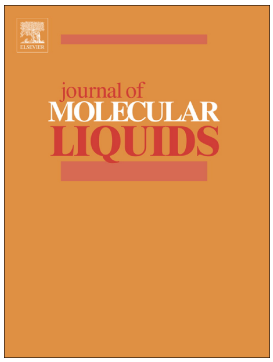


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# Sorption, kinetic, thermodynamics and artificial neural network modelling of phenol and 3-amino-phenol in water on composite iron nano-adsorbent

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## Abstract

Sorption, kinetic, thermodynamics and artificial neural network modelling of phenol and 3-amino-phenol in water on composite iron nano-adsorbent are described. The optimized conditions were 100 g/L conc., 40 min. contact time, 11 pH, 5 mg/10 mL nanoparticles amounts, and 298 K temperature. The data followed Langmuir, Freundlich, Temkin and Dubinin-Radushkevich models. The values of $\Delta G^0$ (average value = -7.14 kJ $mol^{-1}$ for phenol and 7.07 kJ $mol^{-1}$ for amino-phenol), $\Delta H^0$ (-4.92 kJ/mol for phenol and -4.00 kJ/mol for amino-phenol) and $\Delta S^0$ (-7.0 x $10^{-3}$ kJ $mol^{-1}$ $K^{-1}$ for phenol and 6.89 x $10^{-3}$ for amino-phenol) confirmed spontaneous adsorption. The mechanism of sorption was through film diffusion. The maximum percent uptakes of phenol and *p*-amino-phenol and were 85.0 and 80.0%. The method is fast, economic and capable to work at natural water pH. Therefore, the presented method may be used for the removal of phenol and amino-phenol from any water source.

## Keywords

Sorption Kinetic; Thermodynamics; Phenols; 3-Amino-phenol; Water; Mechanism; Neural network modelling.

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