



## Application of dendrimer/titania nanohybrid for the removal of phenol from contaminated wastewater

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### ABSTRACT

In this study, polyamidoamine dendrimer of generation 4 was successfully immobilized on titania nanoparticles to synthesize a new nanohybrid (Den/TiO<sub>2</sub>) with the capability of encapsulation for phenol removal from the polluted effluents. Characterizations of the adsorbent using SEM, TEM, XRD, and FTIR analyses indicated the successful immobilization of dendrimers onto the surface of titania. The effect of important parameters on removal efficiency such as retention time, pH, phenol concentration, Den/TiO<sub>2</sub> dosage, and temperature was investigated. The isotherm, kinetic, and thermodynamic parameters of the removal process were demonstrated, and the experimental data followed the Langmuir and pseudo-second-order model with high correlation coefficients. The calculated thermodynamic parameters showed that the removal of phenol using Den/TiO<sub>2</sub> was an endothermic and spontaneous process. The obtained results indicate that the prepared nanohybrid can be effectively used for the removal of phenol from industrial wastewaters.

*Keywords:* Den/TiO<sub>2</sub> nanohybrid; Phenol removal; Isotherm; Kinetic; Thermodynamic

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