

## **Pb(II) removal and its adsorption from aqueous solution using zinc oxide/graphene oxide**

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### **ABSTRACT**

Eliminating soluble lead ion from wastewater through adsorption has been more critical with the nonstop anthropogenic activity releasing it as waste. This study focuses on synthesizing zinc oxide-modified graphene oxide (ZnO/GO) following the solvothermal method and evaluating its capacity in adsorbing Pb(II) ion. The synthesized ZnO/GO was characterized using X-ray Diffraction (XRD), Fourier-transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscopy with Energy Dispersive X-ray (SEM-EDX) analysis; the results revealed that the graphene oxide (GO) had successfully bonded with zinc oxide (ZnO). The adsorption of Pb(II) on the functionalized ZnO/GO was studied under different experimental conditions, which confirmed the high adsorption capacity of ZnO/GO in removing Pb(II). The optimum pH and adsorbent dosage of ZnO/GO were at pH 5 and 0.16 g/L and the maximum adsorption capacity reached 909.09 mg/g. The most rapid adsorption occurred in the first 30 minutes of contact time with the equilibrium time achieved in 160 minutes and the adsorption isotherm and kinetic followed the Langmuir and pseudo-first order model. Therefore, the newly synthesized ZnO/GO showed superior adsorption capacity for Pb(II) compared to its pure GO.

### **KEYWORDS**

Adsorbent; Heavy metals removal; Zinc oxide; Graphene oxide; Lead removal

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