

## Microstructure and chemical changes of sepiolite and vermiculite clays on the effect of elements adsorption

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**Abstract:** One of the applicable methods to control the pollution of heavy metals is the use of an adsorbent mineral. The aim of this research is to investigate the effect of Nickel and Zinc elements on microstructure properties of sepiolite and vermiculite clay minerals. To address the absorption experiment studies, four treatments (vermiculite, vermiculite + sand soil, sepiolite and sepiolite + sand soil) with six concentrations (0, 0.0001, 0.0005, 0.005, 0.01, 0.05 M) of Zn and Ni solutions were used. Based on the results, the adsorption process of Zinc was found to follow the Freundlich isotherm model, while the Langmuir equilibrium isotherm fit the experimental data of Nickel reasonably well. In addition, sepiolite and vermiculite soils revealed better adsorption capacities for Nickel and Zinc element, respectively. The X-ray micrographs showed that with increasing Nickel and Zinc pollutants concentration, mineral plates expanded and consequently the structures changed. Generally, it could be concluded that both clay soils had substantial adsorption power of pollutants and their microstructure was the main factor for this mechanism.

**Keywords:** *Adsorption; d-spacing; pollutant; clay minerals.*

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