

## Impact of Heavy Metal Contaminants of Lead and Zinc on the Physical and Microstructure of Kaolinite

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**Abstract:** Kaolinite is non-sensitive, low swelling clay with high chemical resistance and high workability. It is commonly found as a major fraction of clay liner in waste disposal sites. These clay liners are usually exposed to different concentrations of heavy metals. Even though there are several researches focusing on the interaction process of kaolinite and heavy metal contaminations, there are only few researches have been conducted to evaluate the influence of pore fluid properties on the microstructure of clayey soils. Therefore, the aim of this research is to investigate the impact of kaolinite and heavy metal interactions on the microstructure of kaolinite. For this purpose, kaolinite soil were laboratory contaminated with different concentrations of lead and zinc nitrates. Then, with performance of a series of physical and microstructural analysis, the change on the behaviour of contaminated kaolinite is assessed. The result of atterberg limits tests as physical experiment shows that with an increase on the concentration of heavy metal contamination, a decrease on the liquid limit happens. Furthermore, in the presence of high concentrations of zinc and lead ions, due to the formation of flocculated structure and retention of water in macropores of soil, the rate of reduction on the liquid limit decreases. The results of SEM micrograph and the variations on the intensity of the XRD peaks confirm the noticeable change on the microstructure of kaolinite.

**Keywords:** *Microstructural properties; Liquid Limit; Kaolinite, Pore fluid; SEM micrograph, XRD.*