

## **Enhancing attapulgite and cement-modified loess for effective landfill lining: A study on seepage prevention and Cu/Pb ion adsorption**

### **ABSTRACT**

This study aims to use attapulgite (ATT) and cement to modify loess as the lining material of landfills in loess areas and to exert the adsorption property of modified loess to ensure seepage prevention. It provides a safe, efficient, low-cost anti-seepage material for constructing a landfill in a loess area. For ATT-modified loess, when the content of ATT is less than 10%, the decrease rate of permeability coefficient is obvious, and when the content is more than 10%, the decrease rate becomes slow. After adding 5% cement on this basis, the permeability coefficient of ATT cement-modified loess is  $8 \times 10^{-8}$  cm/s, which meets the standard requirements ( $\leq 10^{-7}$  cm/s). The results show that the adsorption of Cu and Pb ions on ATT cement-modified loess is higher than that on pure loess. Cu and Pb ions' adsorption rates are 99.2 and 98.5% in a single solution. In the mixed solution, the adsorption rates of copper and lead ions were 97.5 and 98.2%, respectively. Therefore, the study obtained the ratio of modified loess (85% loess + 10% ATT + 5% cement) that can not only meet the seepage prevention requirements of the landfill but also can adsorb heavy