

## **Study on the relationship between permeability coefficient and porosity, the confining and osmotic pressure of attapulgite-modified loess**

### **ABSTRACT**

This study investigated attapulgite-modified loess as an efficient and cost-effective method for creating an impermeable liner for landfills in regions with scarce clay resources. Laboratory permeability tests were conducted using a flexible wall permeameter to determine the permeability of compacted loess and attapulgite mixtures under varying osmotic conditions. The relationship between the permeability coefficient, attapulgite dosage, radial pressure, and osmotic pressure was analyzed. Nuclear magnetic resonance and scanning electron microscopy were also used to observe the microstructure of the modified loess. The results showed that attapulgite dosage significantly reduced the permeability coefficient, but the effect became limited when the content surpassed 10%. The decrease of the permeability coefficient of the modified loess is mainly due to the filling of pores between the loess by attapulgite, which makes the pore size and throat size of the modified loess smaller. The modified loess displayed a sheet structure that contributed to an increased permeability coefficient due to increased radial pressure. This study provides valuable insights into using attapulgite-modified loess as a material for landfill lining in regions with scarce clay resources.