

**ABSTRACT:**

The expansive nature of soils containing high amounts of clay minerals can be altered through chemical stabilization, resulting in a material suitable for construction purposes. The primary objective of this investigation was to study the changes induced in the molecular structure of phosphoric acid stabilized bentonite and lateritic soil using Nuclear Magnetic Resonance (NMR) and Fourier Transform Infrared (FTIR) spectroscopy. Based on the obtained data, it was found that a surface alteration mechanism was the main reason responsible for the improvement of treated soils. Furthermore, the results indicated that the Al present in the octahedral layer of clay minerals were more amenable to chemical attacks and also partly responsible for the formation of new products.