

## Abstract

The applications of various clayey minerals are related to their structural, physical and chemical characteristics. The physical and chemical properties of the clayey minerals dictate their utilization in the process industries and beneficiation required before usage. The study aimed at establishing the potentiality of clayey minerals from the study area, and the possibility of exploring and exploiting them in order to spur industrial development and promote economic self reliance of Kenya as a nation. The plasticity, particle size, surface area, chemical and mineralogy composition, morphological, thermal analysis and other physical properties were studied using various techniques. The clay samples composed of albite (5-16.7%), kaolinite (11.4-36.2%), microcline (15.2-35.3%), quartz (24.3-68.1%), hornblende (7.6% in samples from Ngamwa only), and other mineral impurities in small amounts. Ngamwa clayey materials consist of high impurities of chemical oxides such as  $\text{TiO}_2$ ,  $\text{MnO}$ ,  $\text{MgO}$  and  $\text{Fe}_2\text{O}_3$ . Generally, quartz and iron were the major impurities present in the samples from the concerned sites. The findings shows that clayey minerals from the study area can be exploited for commercial production of ceramic products after beneficiation using low cost and environmental friendly techniques in order to reduce the levels of iron, quartz, and other impurities to acceptable levels.