

Effect of grain size on selected physico-chemical properties of clay

Abstract

Mixture of the right proportion of expanding and non-expanding clays to improve plasticity (moldability) of clays used in the pot industry of Malaysia is yet to be well investigated. In addition, little is known about the choice of the right clay size to eliminate or reduce the content of undesirable compounds such as Fe_2O_3 , Al_2O_3 to improve the strength of pots and roofing tiles in the country. The objective of this study was to investigate how selected physico-chemical properties of pottery clay relate to grain size of Nyalau series ((Typic Paleudults). Approach: Soil samples were refined into 25, 20 and 63 μm using size grading method. The mineralogical composition of the samples was determined using X-Ray Diffraction (XRD). The chemical composition of the samples was also determined using standard procedures. Firing was done at 800°C in a muffle furnace and the cracks of the samples recorded. The clay particles with sizes 20 and 25 μm were higher in LOI and total C than that those of 63 μm regardless of grain size, the clay investigated had quartz (SiO_2), illite-montmorillonite, Anatase (TiO_2) and kaolinite. Grading affected the concentrations of Fe, Al and Si as clays with particle sizes 20 and 25 μm had higher contents of the aforementioned elements compared with those of 63 μm . The clay with particles 63 μm had the best strength and this was so because the clay particles had the lowest amount of Fe, Al and Si. The strength of Malaysian pots could be improved upon proper grading of the clay particles.

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