Geological Aspects of Clay Mineral Distribution

J.W. Herath
Head, Ceramic Research and Development Centre
Piliyandala

The decomposition of a variety of rocks in the island, has resulted in the formation of various soil types. The soils developed, may be residual or sedimentary. Unlike rocks, which are composed of a single type of mineral (rock forming), clays and soil materials are composed of clay minerals, secondary sesquioxide minerals and resistant primary minerals. Kaolinite with a 1:1 layer structure and Montmorillonite with a 2:1 layer structure are the two important clay minerals, from the point of view of industry, agriculture and engineering. Factors that maintain a high base depleting environment, for example, high rainfall, good drainage and high permeability, are conducive to kaolinite formation. In areas of deep and long continued weathering, kaolinite is accompanied by high concentrations of sesquioxide minerals. Factors which contribute to a neutral or alkaline environment, induce the formation of Montmorillonite. When low rainfall conditions prevail, leaching is absent and protracted periods of drought occur, Montmorillonite invariably accumulates, regardless of the nature of parent materials. Although soil parent materials influence soil clay mineralogy, functional variations can develop with climate, vegetation and relief, which may alter the character of soil development. It has been recognised that the behaviour and properties of clays are directly related to their mineralogical composition and that such knowledge could be of much use in various areas of applied sciences, involved in clay mineral studies.