



Mineralogical and Geochemical Characteristics of Cretaceous Kaolin Deposits from West Central Sinai, Egypt

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Petrographic, mineralogical and geochemical studies were carried out on Cretaceous kaolin from west central Sinai, Egypt in order to understand the sediment provenance and genesis and to determine the economic significance of the deposit. Mineral identification and geochemical studies were conducted using powder X-ray diffraction (XRD), differential thermal analyses/thermogravimetric analyses (DTA/TGA), environmental scanning electron microscopy with an energy dispersive X-ray spectrum (ESEM-EDX) technique and back scattered electron analysis (BSE).

Kaolinite in the deposit occurs as irregular platelets, well-developed irregular flakes and a few pseudo-hexagonal stacks.

The chemical composition of the studied kaolin indicated that these rocks have high content of alumina, relatively high content of iron and titanium and very low content of alkalis. Kaolinite is the major phyllosilicate present in the deposit, whereas montmorillonite, illite and smectite occur in minor amounts. Accessory minerals are quartz, goethite, K-feldspar and hematite. Trace elements study proved the sedimentary origin and the fluvial environment of the kaolin.

The data from the heavy minerals study suggests that the kaolin is derived from the alteration of terrigenous sediments that may have weathered from acidic plutonic rocks with subordinate of basic and metamorphic sources.

Mineralogical evidences suggest the sedimentary origin and the influence of fluvial process during and shortly after the deposition of the studied kaolin.

On the basis of the results obtained from mineralogical analyses as well as chemical and diagnostic evaluative analyses, the Cretaceous Sinai kaolin could be exploited in the fabrication of tiles, bricks, sanitary wares and ceramic ware. The raw clay will have to be beneficiated in order to optimize grade and recovery.