## IDENTIFICATION AND CHARACTERRIZATION OF IMPURITIES THAT ARE DETRIMENTAL TO THE WHITENESS OF KAOLIN AT MEETIYAGODA DEPOSIT

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Kaolin is used in many industries due to its properties such as brightness, whiteness, fine particle size, chemical inertness, platy structure, plasticity, refractoriness etc. Kaolin is associated with common ancillary/impurity minerals like feldspar, quartz, mica, iron and titanium minerals and carbonaceous material. Removal of these impurities is of importance in the industrial applications of kaolin. These impurity minerals specially iron, influence the physico-chemical properties of kaolin which adversely affect the quality of ceramic finished products. Iron is present in kaolin as a part of the kaolinite or ancillary mineral structure, which is called "structural iron" or as independent iron minerals such as oxides, hydroxides etc which is called "free iron". These iron impart offwhite, reddish or pinkish colors to the white kaolin that affect its' applications in ceramics. For the present study, the selected area of Meetiyagoda kaolin deposit which is located in low lying swampy areas in the south-west sector of Sri Lanka. This kaolin deposit is residual in nature and a result of the decomposition of quartzo-feldspathic rocks of Precambrian age. In the latter, ground water-containing organic matter, humic and related acids have been the main agencies in the process of kaolinization of feldspar. This study presents details of whiteness, iron content, mineral impurities and their relationship to collected kaolin samples.

Mineralogical, chemical and physical characterizations of the samples were carried out before and after the beneficiation (refining) of samples. Kaolin samples were refined by removing quartz, mica and other coarse particles by wet sieving through a 53 micron mesh. XRD, ED-XRF and chemical analyses were carried out for raw kaolin samples, their refined samples and blackish-gray solid sample which was associated with kaolin in sampling area. Whiteness analysis also was carried out for both raw and refined samples.

Kaolinite was the only clay mineral present in the deposit. The main mineral impurity present was quartz, and most of the quartz present had been removed during beneficiation. Whiteness index of all samples were negatively correlated with the iron content. Majority of samples were suitable for manufacturing of ceramic products since they are characterized by lower Fe content (less than 1 %) and higher whiteness index (more than 80 %). Black gray solid material which was associated with kaolin was identified and it was found to be mostly iron pyrites. Further, it was revealed that the mineralogical composition, physical properties and chemical characteristics of the raw materials are highly variable within the deposit, even within short distances.

