Contribution ID: **38** Type: **not specified**

XRD spectra of Algerian porcelain

Porcelains represent the basis of the ceramic discipline. The compositions for the different types of industrial porcelain are presented graphically as part of the K2O-Al2O3-SiO2 phase diagram. This work presents a study conducted on four porcelain formulations. Compositions made by mixing materials such as kaolin, quartz, potassium feldspar and talc were studied. Results of a study are presented to determine how the type and proportion of each raw material in the starting mixture affects the porcelain phase. The extent of the above physicochemical transformations can vary considerably depending on the properties of the starting materials. These can cause significant changes in the properties of the fired product.
The crystalline phases of formulated porcelain are the same as found in certain porcelains. Many reactions observed with the individual raw materials were also observed in the mixture. The main variations relate to (i) crystallization of cristobalite is observed only in the kaolin and not in the mixture, where the silica precipitated from the reaction to form mullite from metakaolinite is readily incorporated into the alkaline amorphous phase; (ii) quartz is only temperature stable but tends to partially decompose on contact with the alkaline melt in the mixture; and (iii) in illite-rich clay, the melting of the system and subsequent expansion caused by pyroplastic deformation of the K-rich melt begins at a relatively low temperature.
Quartz is a residual mineral from the original raw materials, and mullite, formed during firing. Porcelain fired bodies generally contain a single mullite phase, 3Al2O3.2SiO2, evolution pathway: the dehydroxylated kaolin, metakaolin, transforms into a nonequilibrium unstable spinel type structure, which converts to mullite above 1075 ℃. In aluminous porcelain, corundum is observed in addition to quartz. Furthermore, X-ray analysis indicated that no significant effect on mullitisation was observed in talc formulation. Addition of talc had little effect on the mullite content of the fired body. However, talc contributes greatly to the increased formation of a glassy matrix.

Summary

Primary author: KITOUNI, Saida (Université de Constantine 3- Salah Boubnider Constantine Algérie)

Presenter: KITOUNI, Saida (Université de Constantine 3- Salah Boubnider Constantine Algérie)

Session Classification: Materials investigation techniques