showed that, during its heat treatment, β-eucryptite was first precipitated at about 850°C and then β-spodumene at about 1000°C. Microscopic examination showed that β-spodumene, after its precipitation, decreased its grain size by fission, by still unknown reason, with increasing temperature. Above 1000°C the marked increase in specific density of the specimen with increasing temperature was also observed.

(3) **Effects of heat treatments on strength.** The conditions of heat treatment such as the heating rate and the maximum holding temperature were varied and their effects on the modulus of rupture of the resultant polycrystalline materials were determined. The slow heating with the rate at least below 5°C/min. in the temperature interval of 800 to 900°C, in which β-eucryptite was first precipitated in the specimen, was found to be necessary increasing the strength. The specimen which missed this heat treatment had poor strength. The strength was also found to increase with incresing the maximum holding temperature. This change was attributed to the decrease in grain size of β-spodumene and also to the compacting of microstructure.

Studies on the Dielectric Loss of Polycrystalline Material Produced from the Glass of the System Li_2O-MgO-Al_2O_3-SiO_2

Sumio SAKKA and Megumi TASHIRO

Yogyo Kyokaishi (*Journal of the Ceramic Association, Japan*), **69**, 393 (1961)

In the previous paper (*J. Ceram. Assoc. Japan*, **60** [10] 223 (1960)) the authors have given the method of converting the glasses of the system Li_2O-MgO-Al_2O_3-SiO_2 into a polycrystalline material with or without the addition of platinum nucleus, the amount of which was limited to a very small value. The results of the measurement of the mechanical and thermal properties of the material produced were also published (*J. Ceram. Assoc., Japan*, **69** [2] 35 (1961)). The present paper concerns the dielectric loss of the same material which was expected to show the effect of chemical composition and heat treatment.

(1) **Effect of heat treatment.** The glass of the composition, MgO 15, Al_2O_3 23, SiO_2 62, Li_2O x, where $x=4, 6, 8, 12$ by weight ratio, were melted, and reheated with the constant rate of 5°C/min. to a temperature from 750°C to 1200°C.

The tan δ at 1 Mc of the crystallized specimens showed that, in general, it became higher than the base glass by the heat treatment at a temperature between 750°C and 950°C, whereas the heating at a temperature higher than 1000°C brought about a great decrese in tan δ.

The increase of tan δ may be attributed to the formation of β-eucriptite which usually occurs in the low temperature range, while the sudden decrease in tan δ may be attributed to the formation of β-spodumen which appears with the cost of vanishing β-eucryptite.

(2) **Effect of the chemical composition of the base glass.** It is likely that

the amount of platinum, 0.01%, was too small to have an effect on tan δ, and also the cardinal component of base glass, such as MgO, Al_2O_3 and SiO_2 behaved themselves rather indifferent. On the contrary, Li_2O showed a strong influence, and the decrease of Li_2O content seemed to be especially fovourable for the formation of β-spodumen and consequently the lowering of tan δ.

(3) **Effect of additional components.** The glasses of the base composition, Li_2O 4, MgO 15, Al_2O_3 15, and SiO_2 62 by weight, and added by a small amount of any of the components, Na_2O, K_2O, BeO, CaO, SrO, ZnO, CdO or PbO were melted and reheated at above 9 50°C. Among such second components PbO was the most effective, giving tanδ of $3\sim4\times10^{-4}$ at 1 Mc at room temperaure with the addition of PbO: 0.045 mols to 104g of the base glass.

Some Considerations on the Measuring Method of the Thixotropic Properties of Some Clay Slips

Kaoru UMEYA

Zairyo Shiken (Journal of the Japan Society for Testing Materials), **10**, 328 (1961)

Two measuring methods are mainly used to obtain the thixotropic properties of clay slips. One of these is the method to measure the thixotropic properties by the stress decay, and the other is the hysteresis loop method.

The author has already reported the results obtained through the stress decay method, and here in this paper, the results gained from the hysteresis loop method are reported.

The results obtained by this method indicate that

(1) the hysteresis area, that is, thixotropic behavior, of the caly slips, decreases exponentially with the increase of the water content,

(2) the hysteresis area, also, decreases exponentially with the increase of the amount of deflocculant quantity.

The thixotropic levels are decided by the method of the stress decay, and the degrees of thixotropic behavior may be obtained by the hysteresis loops, and yet no distinct relation has been found so far between the thixotropic levels and degrees of thixotropy. In this paper, we obtain the conversing constant between the two quantities experimentally, and the conversing constant are decided using several clay slips.
