



PROJECT "THEORY AND APPLICATIONS OF SINTER-CRYSTALLIZATION" DN 19/7

**Effect of the addition of kaolin on the sinterability and
microstructure of a glass-ceramic glaze**

J. L. Amorós

Instituto de Tecnología Cerámica (ITC). Castellón. Spain.

jose Luis.amoros@itc.uji.es

E. Blasco

Instituto de Tecnología Cerámica (ITC). Castellón. Spain.

encarna.blasco@itc.uji.es

A. Moreno

Instituto de Tecnología Cerámica (ITC). Castellón. Spain.

arnaldo.moreno@itc.uji.es

C. Feliu

Instituto de Tecnología Cerámica (ITC). Castellón. Spain.

carlos.feliu@itc.uji.es

Abstract: The effect of kaolin addition on the sinter-crystallization of a $\text{SiO}_2 - \text{Al}_2\text{O}_3 - \text{RO}$ ($\text{R} = \text{Ca}, \text{Mg}, \text{Sr}$) glass-ceramic glaze that devitrifies anorthoclase and diopside was studied using non-isothermal techniques (ATD and heating microscopy). It was found that increasing kaolin content makes the values of the starting temperatures and the maximum crystallization rate (peak temperature) increase. The following technological characteristics of pressed specimens fired at a heating rate of $15\text{K} / \text{min}$ up to different maximum temperatures, with a dwell time of 6 min, were determined by the usual methods: linear firing shrinkage, absorption capacity of water, and relative density. For some selected temperatures, the microstructure of the fired specimens was observed by SEM-EDX, and the total porosity and the pore size distribution were determined by microscopy and image analysis. It was found that on increasing kaolin content, the temperature range in which sintering and crystallization takes place shifts towards higher temperatures, which is particularly true in the case of sintering. Consequently, the glaze porosity and the temperature at which the maximum densification is reached also increase, in other words, increasing the kaolin content in a glaze reduces its sinterability. Likewise, it was observed that when the kaolin content increases, the linear firing shrinkage decreases, due to the higher compactness of the unfired glaze.