

Effects of nucleating agents on diopside crystallization in new glass-ceramics for tile-glaze application

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Abstract

The effect of crystallization produced by addition of TiO_2 , ZrO_2 and P_2O_5 oxides to glass-ceramic of the system CaO-MgO-SiO_2 was studied using structural and thermal techniques. The devitrification process was independent of thermal treatment. X-ray diffraction studies performed on the glass-ceramic system indicated that diopside crystalline phase was more thermodynamically favourable than other phases. The effect of the nucleating agent depends on its nature: TiO_2 decreased the activation energy while P_2O_5 and ZrO_2 did not. SEM analysis of the doped glass-ceramics showed randomly distributed crystals with significant dimensional variations from those of the undoped system. All these formulations, showing a high crystallization rate, and a fast heating rate, can be used as tile glazes and/or tile-glaze components.

Keywords

TiO₂ Crystallization P₂O₅ Diopside Crystallization Rate
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