

RESUMEN N° 40

CRYSTALLIZATION BEHAVIOUR OF CaO-Al₂O₃-SiO₂ GLASS CERAMIC GLAZES USING TiO₂ AND MULLITE UNDER FAST FIRING CONDITIONS

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The study aimed to investigate the effects of different amounts of TiO₂ and mullite addition on crystallization behavior of glass-ceramic glazes belonging to the CaO-Al₂O₃-SiO₂ system. For this aim, anorthite based glass-ceramic glazes were synthesized by formulating TiO₂ or mullite doped glaze compositions containing different frits. Synthesized glazes were applied on to the porcelain tile and fired at 1205°C in the industrial roller furnace for 42 minutes (cold to cold). The crystalline phases were determined by X-ray diffraction (XRD). Anorthite was found to be the only crystalline phase that exists in the glass ceramics system. The crystallization kinetics was determined by differential thermal analysis (DTA). Scanning electron microscope (SEM) attached with an energy dispersive (EDX) spectrometer was further employed to investigate microstructural and microchemical features on the fired glazes. According to the results, anorthite crystallization was improved with the addition of TiO₂ and mullite. However, lath-like anorthite crystals were observed to form as segregated regions across the TiO₂ doped glaze. This, in turn caused the formation of expansion cracks within the glaze.

Key words : Glass ceramics, Anorthite, Crystallization, Microstructure

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