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LSA Glass-Ceramic Tiles Made by Powder Pressing

Fernando Cardoso Figueira[a], Adriano Michael Bernardin[a,b]

amb@unesc.net

[a]Engenharia de Materiais, Universidade do Extremo Sul Catarinense, Criciúma, Santa Catarina, Brazil

[b]Tecnologia em Cerâmica, Serviço Nacional de Aprendizagem Industrial, Tijucas, Santa Catarina, Brazil

A low cost alternative for the production of glass-ceramic materials is the pressing of the matrix glass powders and its consolidation simultaneously with crystallization in a single stage of sintering. The main objective of this work was to obtain LSA glass-ceramics with low thermal expansion, processed by pressing and sintering a ceramic frit powder. The raw materials were homogenized and melted (1480°C, 80min), and the melt was poured in water. The glass was chemically (XRF and AAS) and thermally (DTA, 10°C/min, air) characterized, and then ground (60min and 120min). The ground powders were characterized (laser diffraction) and compressed (35MPa and 45MPa), thus forming four systems. The compacts were dried (150°C, 24h) and sintered (1175°C and 1185°C, 10°C/min). Finally, the glass-ceramics were characterized by microstructural analysis (SEM and XRD), mechanical behavior ($\sigma_{bending}$) and thermal analysis (α). The best results for thermal expansion were those for the glass-ceramics processed with smaller particle size and greater compaction pressure.

Keywords: glass-ceramics, conformation of powders, sintering, crystallization.