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## LZSA parent glass-ceramic powders with modified surfaces to produce low porosity ceramic floor tiles

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The ceramic sector is continually searching the developing of new materials to obtain products with better performance. Among the developed ceramic materials in the last 40 years glass-ceramics assumed very important positions since they show properties of glasses and crystalline solids. Traditionally glass-ceramics are obtained from melting of oxides and forming of the viscous liquid. This process is similar to that used for the fabrication of glasses even if the resulting material shows crystals and residual glassy phase. In the last 20 years glass-ceramic materials are being produced by powder technology. In this case, the glass-ceramic parent glass powder is compacted in the desiderated shape and dimensions and, in a later step, the obtained compact is subjected to a heat-treatment which involves sintering and crystallization and so the consolidation and the definition of properties. In fact, properties of glass-ceramic materials depend, fundamentally, on the intrinsic properties of the formed crystalline and glassy phases and their amounts, dimensions and morphology and also, in this case, on the residual porosity. The residual porosity can be an important limitation in some applications. The porosity reduction or elimination implies in higher material densification which can be obtained by an adequate sintering and crystallization heat-treatments and also by an adjustment or modification of the characteristics and properties of the glass-ceramic parent glass powder. Chemical treatments used to reduce heterogeneities can be an alternative to modify the particle surfaces of glass powders and thus to retard the nucleation and crystallization processes enlarging the sintering interval to higher temperatures. Some examples of surface treatments, which improve the glass powder sinterability are etching by NaOH solutions, chemical coating and ionic exchange. The ionic exchange is used to obtain high-density glass-ceramics and consists in the substitution of a small ion in the amorphous glass network by a larger ion from a mixture of alkali salts. The resulting chemically treated powders show particles with higher densities in respect to the untreated ones. In this context this work has as objectives the production and characterization of LZSA ($Li_2O$-$ZrO_2$-$SiO_2$-$Al_2O_3$) glass-ceramic parent glass powders with modified surfaces to obtain high-density materials with optimized properties and high performance for ceramic floor tile applications. In this case, ceramic floor tiles analogous to porcelainized stoneware tiles but with higher staining resistance could be obtained.

***Key words:*** *glass-ceramic, ceramic, ionic exchange, ceramic floor tile.*

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