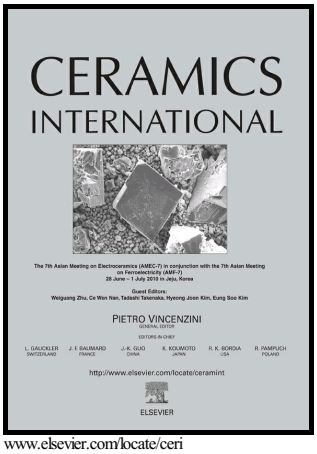


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# Structural and microstructural comparison of bioactive melt-derived and gel-derived glasses from $CaO-SiO_2$ binary system

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**Abstract**

Two glasses from $CaO-SiO_2$ binary system were obtained by sol-gel and melting techniques. The effect of two different glass obtaining methods was investigated using X-ray diffraction, FTIR, Raman and $^{29}Si$ MAS-NMR spectroscopic methods. The measurements revealed significant differences in the glasses structure. Although both glasses were fully amorphous, the gel-derived glass had a more polymerized structure compared to the melt-derived one. The studied glasses were characterized by BET analysis to provide information about specific surface area of the obtained materials. Apart from microstructural evaluation, thermal properties and in vitro bioactivity study of all glasses were conducted to demonstrate differences in performance of the samples. The formation process of hydroxycarbonate apatite (HCA) layer was investigated using inductively coupled plasma mass spectrometry (ICP-MS) and structural studies.

*Keywords: bioactive glasses, spectroscopic studies, sol-gel derived glass, melt-derived glass*

## 1. Introduction