عنوان مقاله:

A NEW GENERATION OF OXYNITRIDE GLASSES CONTAINING FLUORINE

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خلاصه مقاله:

Oxynitride glasses are found as grain boundary phases in silicon nitride ceramics. They are effectively alumino-silicate glasses in which nitrogen substitutes for oxygen in the glass network, and this causes increases in glass transition and softening temperatures, viscosities (by two to three orders of magnitude), elastic moduli and microhardness. Calcium silicate-based glasses containing fluorine are known to have useful characteristics as potential bioactive materials. Therefore, the combination of both nitrogen and fluorine additions to these glasses may give useful glasses or glass-ceramics with enhanced mechanical stability for use in biomedical applications. This paper reports glass formation and evaluation of glass thermal properties in the Ca-Si-Al-O-N-F system. Within the previously defined Ca-Si-Al-O-N glass forming region at ۲۰ eq.% N, homogeneous, dense glasses are formed. However, addition of fluorine affects glass formation and the reactivity of glass melts. This can lead to fluorine loss as SiF_4, and also nitrogen loss, leading to bubble formation and porous glasses. The compositional limits for both denseand porous glass formation at ۲۰ eq.% N and ۵ eq.% F have been mapped. At high fluorine contents under conditions when Ca-F bonding is favoured, CaF_2 crystals precipitate in the glass. The role of the different cations on glass formation in these oxyfluoro-nitride glasses is discussed.

کلمات کلیدی:

Ca-SiAlON, Oxynitride, Fluorine, Glass Formation, Thermal Properties