

SILICA GLASS- FERROELECTRIC CRYSTALS COMPOSITES

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The possibility of incorporation of Ferroelectric crystals in silica glasses by sintering was investigated. Sintering versus crystallization rates were first modeled for silica-soda-lime glasses with well known expressions from the literature for heat treatments performed above T_g . Optimum conditions calculated in order to obtain amorphous sintered bodies were compared with experiments. The Ferroelectric used here was LiNbO_3 which was prepared by the so-called Pechini method with different concentrations of Eu^{3+} and characterized by x-ray diffraction, vibrational and electronic spectroscopy. The reactivity of the viscous glass against the crystalline phase was then evaluated with incorporation experiments performed at selected temperatures above T_g . Different amounts of crystalline phase were mixed with soda-lime-silica glass spheres and sintering experiments were conducted. The resulting composite material were characterized and optimum conditions for incorporation preserving the Ferroelectric crystal structure. Luminescence spectroscopy, X-ray diffraction, Raman spectroscopy (micro) were the techniques utilized in the characterization of the composites.