Effect of radiation on biologically active glasses

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Abstract

Multifunctional hydroxyapatites single crystals have been studied for their applications as the laser host material since past several decades. It is only recently their potential has been evaluated for bioactive materials. In the past researches, Czochralski and flux growth methods have been utilized to achieve single crystals. We have used low temperature processing techniques for synthesis. Organic melt was used to achieve oriented fibers by the directional solidification method. This organic treated material has different characteristics than coarsened oxide materials. Our approach involved low temperature processing using nano engineered powders of the material system Na_2O-K_2O-CaO- MgO-SrO-SiO_2. Also, borates were processed by sintering and grain growth. Effect of γ-ray was studied by measuring the electrical characteristics of radiated samples. Our experiments to further improve mechanical characteristics indicate that substitution of calcium with some other elements such as gallium have great potential to improve the radiation hardening and mechanical properties of bones.