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Effect of Sodium Bicarbonate Additions on the Physical, Mechanical and Bioactive Property of Sol-Gel Bioglass

Abstract

Porous bioceramics are the materials of choice for non-load bearing bone implants. Calcium phosphates and bioglass are widely used due to excellent biocompability. The primary function of porous bioceramics are as filler material for bone defects. In this research, 10% amount of sodium bicarbonates (Na2HCO3) were mixed with sol-gel derived glass powder (SiO2-CaO-P2O5) and sintered at 700 C for 3 hours. It was found that, additions of sodium bicarbonate induced a foaming effect during sintering of bioglass thus increased the porosity content of the glass-ceramics obtained. However, the increased in porosity significantly reduced the compressive strength of the crystallized glass. The increased in porosity content and formation of sodium related phases within the crystallized glass matrix after sintering resulted in enhancement of its in vitro bioactivity property when tested in SBF solution.