

# Comparative Mechanical Property Behaviors in Bioglass Scaffolds for Biomedical Applications

Mehtap Demirel<sup>1,a</sup>, Bunyamin Aksakal<sup>2,b</sup>

<sup>1</sup>Adiyaman University, Vocational School of Technical Sci, Adiyaman, Turkey

<sup>2</sup>Yildiz technical University, Faculty of Chemical and Metallurgy, Dept Metallurgy and Mater Eng. Istanbul, Turkey

<sup>a</sup>mdemirel@adiyaman.edu.tr, <sup>b</sup>baksakal@yildiz.edu.tr

## Abstract

Bioglass based bone scaffolds was produced via sol gel method to examine the effects of porosity on mechanical properties. To produce bioglass some inorganics such as CaO, KH<sub>2</sub>PO<sub>4</sub>, P<sub>2</sub>O<sub>5</sub>, Na<sub>2</sub>CO<sub>3</sub> and gelatin were used. The effects of densification, phase composition morphology and mechanical properties of bioglass based scaffold is evaluated. XRD and FTIR analysis was performed in regards to the effects on mechanical properties and phase transformations of the scaffolds which was obtained by the introduction of additives into bioglass to enhance the gelation and sinterability. SEM analyzes are performed to show the structural and morfological changes in produced bioglass scaffold. To obtain porous structure, different amounts of gelatin was added into bioglass-based scaffold. The porous structure have been obtained and was examined in regards to the effects on the mechanical properties of the scaffold. From SEM analysis, it was demonstrated that the concentration and pores size increased with the increased amount of gelatin. Besides, it was also shown that the increasing pore size caused decrease in hardness and comprative strenght of scaffold. Biocompatibility was tested with *Cytotoxicity* experiments and produced scaffolds showed no toxic effects.

**Keywords:** Bioglass, Scaffold, Porosity, mechanical properties.