Biphase calcium phosphate (BCP) macroporous scaffold with different ratios of HA/β-TCP by combination of gel casting and polymer sponge methods

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Abstract:

Open and interconnected porous scaffolds were prepared with various ratios of hydroxyapatite (HA)/β-tricalcium phosphate by a combination of gel casting and polymer sponge methods to improve the mechanical properties and structure. The scaffolds were prepared using slurries containing 50 vol-% of ceramic powders and sintered at 1100°C for 2 h. Thermogravimetric analysis shows that the pore-temperature to burn out organic materials and polyurethane foams is 600°C. The compressive strength was between 53 and 64 MPa. Field emission scanning electron microscope shows an open, relatively uniform and large interconnected porous structure with pore size ranging between 150 and 400 μm. X-ray diffraction and Brunauer-Emmett-Teller methods were employed to determine the microstructural crystalline and surface area respectively. The results show that the compressive strength of scaffolds increased with the increase in HA concentration. The reason can be explained by the increasing pore wall thickness and density in scaffolds.

References: 30 references