



Production and Characterization of Ti6Al4V Foam for Cancellous Bone Implants

M. Aryana (1) - S.K. Sadrnezhad (2) - N. Hassanzadeh Nemati (3)

Science and Research Branch, Islamic Azad University, Tehran, Iran

aryana.maryam@yahoo.com

Abstract :

The aim of this research was powder metallurgy fabrication of titanium-vanadium-aluminum foam for substitution in place of cancellous bones. Elemental particles were milled for 30 h and then mixed with 200-400 μm cuboidal NaCl as space holder. The mixture having 0.40-0.60 volume fraction NaCl was pressed at 500-600 MPa pressure and then sintered in an electric furnace having 790 and 950 °C temperature (hotter than the melting point of NaCl: 801°C) according to single and double stage procedures under vacuum to produce artificial sponge samples. The samples were soaked in water for 48 h to wash-out the NaCl and their microstructural images were taken. The foamy structures obtained showed (a) macropores in place of the detached salt particles and (b) micropores created because of fragmentary sintering effects. The cuboidal shape of the NaCl particles was copied completely into the Ti6Al4V foam and highly interconnected pore architecture seemed well-fitted for cancellous bone tissue adherence.

Keywords :

Ti6Al4V, Metallic foam, Sodium chloride, Cancellous bone, Space-holder, Mechanical properties

1-Department of Biomedical Engineering

2-3-Department of Materials Science and Engineering, Sharif University of Technology