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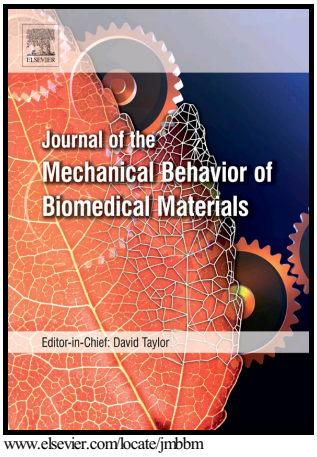

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Abstract

The titanium opaque porcelain was synthesized through sol-gel using borate-silicate system. The porcelain was characterized by DSC-TG, X-ray diffraction, N_2 adsorption-desorption isotherms and scanning electron microscope tests. The results of DSC showed that the nitrates could be decomposed completely when the bioglass xerogel precursor was heat-treated at 760℃. The XRD results showed that the $Na_2Ca_3Si_6O_{16}$ was the major phase of the opaque porcelain. The synthesized opaque porcelain powders had an average particle size of about 5 μm to 25 μm with nanopores of around 50-70 nm on the surface. The BET average surface area of the porcelain was 12.67 m^2/g, while the average pore diameters for adsorption and desorption were 9.73 and 10.16 nm, respectively. The flexure strength significantly increased from 47.4 MPa to 116.2 MPa with the sintering temperature increasing from 575℃ to 600℃. The XRD, FTIR and EDS results proved that hydroxyapatite had formed on the porcelain surface after incubation in simulated body fluid.

Graphical abstract