

Effect of Zirconia Addition on the Thermal Properties of FHA-YTZP Composites

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ABSTRACT

Yttria-stabilized tetragonal zirconia (YTZP) has been used as a reinforcement material for hydroxyapatite (HA) ceramics due to its biocompatibility and excellent mechanical properties. However, the addition of YTZP into the HA matrices tends to accelerate the decomposition of the HA phase at high temperatures. In this study thermally stable fluoroapatite (HA06F; $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{2-2x}\text{F}_{2x}$ with $x = 0.6$) was mixed with YTZP to produce a series of HA06F-YTZP composites with 2.5, 5, 10, 20, 40, and 60 wt% YTZP using the co-precipitation method and via pressureless sintering. It was found that for the HA06F-YTZP composites with the YTZP contents below 20 wt%, the decomposition of the HA06F phase was suppressed even up to the sintering temperature of 1400°C.

Keywords: Yttria-stabilized tetragonal zirconia, fluoroapatite, composite, sintering and thermal properties