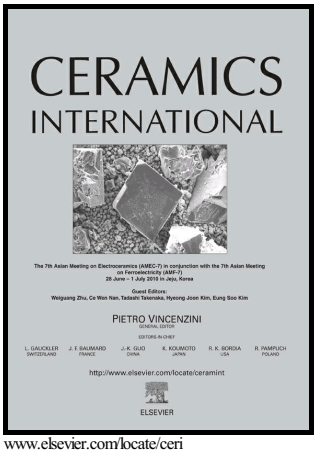

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Biocompatibility and Drilling Performance of Beta Tricalcium Phosphate : Yttrium Phosphate Bioceramic Composite

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Abstract

A machinable beta tricalcium phosphate [β-TCP, $Ca_3(PO_4)_2$]-based composite has been produced by the classical ceramic sintering route by creating a weak interphase material of yttrium phosphate [YP, YPO_4], from chemically synthesized and calcined β-TCP and up to 50 wt.% YP powders. Sintered composites were characterized for phase constitution, densification and machinability (drilling) by using high-speed steel (HSS) and solid carbide (SC) drills in a conventional radial drilling machine. The effect of variation in drilling parameters (cutting speed and feed), cutting tool, batch composition on torque, thrust force and tool wear were studied. The biocompatibility of the sintered composites was also evaluated. It was found that with the increasing YP content the relative density of the composites decreased with an associated improvement in machinability with HSS and SC drills. Biocompatibility was also confirmed for the all the sintered composites.

Keywords

Beta tricalcium phosphate, Yttrium phosphate, Biocompatibility, Composite, Drilling.