Ia32-005

Obtention of Beta-CPP by sintering process, using lyophilized and non-lyophilized precursors

Pinto, G.C.(1); Piazza, R.D.(2); Santos, C.C.(3); Guastaldi, A.C.(4); De Oliveira E Silva, N.J.(4); Jafelicci Júnior, M.(1); Marques, R.F.C.(5);
(1) IQ-UNESP; (2) Unesp; (3) UNESP; (4) ; (5) IQ-Unesp;

Introduction. ?-CPP bioceramics influence the multimillion-dollar bone graft market and can be marketed in different ways, such as: injectable, in pieces, in cylindrical or block shapes. However, what is sought in the nowadays studies of these biomaterials are methods of obtainment that can provide more precise information regarding the particle size, mechanical properties, morphology, and crystalline structures, thus being able to expand its production in a more efficient, cheaper, and safer way. Experimental section. Through a wet chemical method, the precursor of ?-CPP was synthesized. The calcium hydrogen phosphate dihydrate (DCPD) phase was obtained by dropwising 30 drops per minute of 200 mL phosphoric acid solution (0.6 mol L-1) over 200 mL of calcium hydroxide solution (1.0 mol L-1) under mechanical stirring (300 rpm) for three hours. Filtration process was required for the removal of the aqueous medium. Two fractions of this sample were separated, one was freeze-dried and the other was dried at room temperature. For the obtention of ?-CPP, both DCPD powder fractions were calcinated at 600°, 750°, 900° and 1150 °C for three hours. Results and discussion. Infrared absorption bands at 500, 550, 900 and 970 cm-1, found in the two groups of samples, can be attributed to the PO43- ions. The increasing formation of the ?-CPP phase during sintering also induces a percentage increase in the P2O7 groups, observed by the presence of O-P-O bonds, assigned at 745 and 1045 cm-1 in Raman spectra. Similar phase transition behaviors from DCPD (less stable) to HA and ?-CPP (more stable phase) are also observed in both XRD groups. However, the phase transition percentages were higher with gradual temperature variation in the freeze-dried group.