Study of the Microstructural and Mechanical Properties of a Phosphocalcic Bone Substitute

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Abstract: The choice of calcium phosphate materials in reconstructive surgery is justified by the surprising similarities between the composition of these materials and that of the bone. Among a multitude of bone substitutes, hydroxyapatite of chemical composition Ca10(PO4)6(OH)2 is the material most similar to natural apatites. In this study, hydroxyapatite was developed using the wet precipitation method from hydrated calcium chloride (CaCl2,12H2O) as a source of calcium and di-sodium hydrogen phosphate dihydrate (HNa2PO4,2H2O) as a source of phosphate. Vickers Microhardness tests and XRD analyzes were used for the characterization of the synthesized material. The mechanical properties namely HV, ¿e, and ¿r. KIC and microstructural like cristallite size Dhkl and degree of cristallinity Xc were discussed according to the temperatures of the heat treatments. Two temperatures were chosen 900 and 1200°C. From the results obtained, it is obvious that the variation of the different properties studied correlates with the temperature of the heat treatment.

Keywords: Phosphocalcic ceramic, hydroxapatite, Wet precipitation, hardness, Thoughness, Crytallinity