

QUANTITATIVE ANALYSIS OF HYDROXYLAPATITE-ZIRCONIA BIOMATERIAL USING THE RIETVELD METHOD

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Ceramic as hydroxyapatite (HAP) has a potential to prosthetic applications because it can form a strong bond with the bone. In present, the strengthening of biomaterials is one the most active research areas in the field of ceramics. The zirconia into HAP may improve the mechanical properties and will not affect its biocompatibility. This work analyzes the phase formation into HAP-zirconia system.

The HAP powder supplied from OSTEOSYNTH, S.L., Barcelona, Spain, was calcined at 800°C for 3h and disaggregated in a ball-mill. The HAP and zirconia powder was milled and mixed in acetone media in a ball-mill. For heated sample at 1500°C, the XRD analysis shows the crystalline phases of HAP, β -tricalcium phosphate (β -TCP), calcium zirconate and cubic zirconia (stabilized 8% Y_2O_3). Quantitative phase analysis was performed by Rietveld refinement using the Howard & Hill Method. The results showed that quantitative crystal phases present was 61.77% HAP, 25.24% β -TCP, 8.02% $CaZrO_3$ and 4.97% ZrO_2 (8% Y_2O_3) in weight. The results show that analysis by Rietveld method is efficient to control the quantities of each phase in the sinterization process.