

# **CALCIUM PHOSPHATES FOR CLINICAL APPLICATION WITH VARIABLE PHASE COMPOSITION: SYNTHESIS AND CHARACTERIZATION**

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Hydroxyapatite (Hap) and  $\beta$ -tricalcium phosphate ( $\beta$ -TCP) represent the main types of calcium phosphates used in maxillofacial surgery. Hap is thermodynamically the most stable phase in physiological conditions and has the ability to form direct chemical bonding with living tissues while  $\beta$ -TCP is a resorbable material and stimulates new bone formation. Biphasic calcium phosphates (BCP) were developed to combine the high bioactivity of Hap and bioresorbability of  $\beta$ -TCP. These properties can be controlled by varying Hap/ $\beta$ -TCP ratio.

Hydroxyapatite (Hap),  $\beta$ -tricalcium phosphate ( $\beta$ -TCP) and mixtures of Hap/ $\beta$ -TCP in different proportions were synthesized by wet chemical precipitation method in aqueous medium using calcium hydroxide suspension and orthophosphoric acid solution as starting materials. This method is characterized by simple process, low cost and easy application in industrial production.

The aim of this study was to investigate the influence of wet chemical precipitation conditions on calcium phosphates to control not only the phase composition, but also chemical composition, particle morphology and sinterability.

The phase identification, chemical composition, morphological characteristics and sintering behaviour were investigated by X-ray powder diffraction (XRD), Fourier-transform infrared (FT-IR) spectroscopy and scanning electron microscopy (SEM).

The phase composition of calcium phosphates is found to be highly dependent on the changes in technological parameters such as temperature, Ph of synthesis and thermal processing.