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Electron Microscopy Characterization of Hydroxyapatite Obtained by Hydrothermal Synthesis.

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Some calcium phosphates have a great importance because its characteristics and properties, such as hydroxyapatite ($Ca_{10}(PO_4)_6(OH)_2$). This one exists in bone and teeth, the main inorganic phase. Bone has a porous structure formed by hydroxyapatite crystals and an organic matrix of collagen, this structure is very important when we are looking for a material to replace bone or hard tissues. Synthetic hydroxyapatite has been studied because its crystallographic and chemical properties are important elements to found an adequate bone substitute. Besides, hydroxyapatite has two important characteristics in biomaterials: biocompatibility and bioactivity.

In this work, we comment the results obtained from hydroxyapatite synthesized using the hydrothermal method. Hydrothermal method can be used instead of solution method; it involves high energy, accelerated process and better equilibrium. It was adequate due to easy achieve of fine and crystalline powder.

Hydroxyapatite was synthesized starting from calcium oxide (lime) and diammonium phosphate by hydrothermal process inside an autoclave. The product was characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). For X-ray diffraction, an BRUKER-AXS Diffractometer was used. For SEM observation a JEOL 5600LV, that has attached an NORAN-EDS equipment, was used. For TEM analysis, a JEOL 100CX was used.

In all cases irregular structures were found, whose solid part was compound for agglomerates of not very defined particles and size less than 5 μm (Figure 1). Two main phases, whitlockite and hydroxyapatite, were identified by X-ray diffraction.

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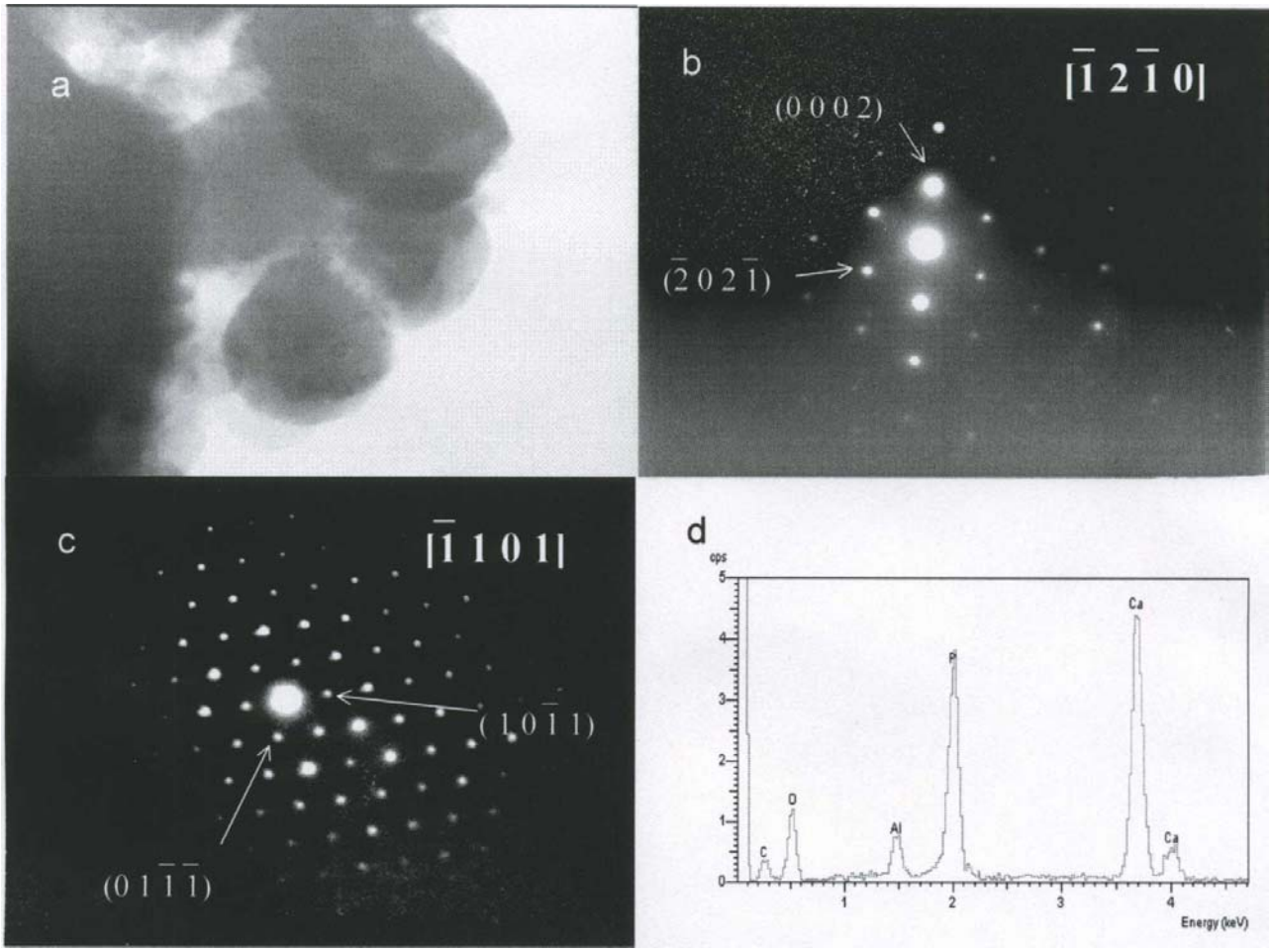

FIG. 1. Transmission electron microscopy results. a) Bright field image of hydroxyapatite particles about 400 nm. b) Diffraction pattern in [ī 2 ī 0] direction. c) Diffraction pattern in [ī 1 0 1] direction. d) Elemental analysis by EDS.

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