SYNTHESIS AND CHARACTERIZATION OF HYDROXYAPATITE DERIVED FROM EPPAWALA APATITE FOR BIO MEDICAL APPLICATIONS

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by

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Abstract

Hydroxyapatite is widely used as a bio implant material because of its chemical and structural similarity with the mineral phase of bone and teeth. However, synthesize of this material from natural minerals is not that much popular. Here, we synthesized hydroxyapatite from apatite (high grade phosphate) available in Eppawala, Sri Lanka as a value added product. The synthesize procedure was carried out using two different methods i.e. sol-gel method and solid-state pressure less sintering. Synthesizing by sol-gel method was done in two different ways. The first method was mixing apatite with ethanol and the second method was mixing apatite with diluted nitric acid. The solid-state pressure less sintering was done by mixing apatite with calcium hydroxide. The obtained hydroxyapatite powders were characterized by Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction spectroscopy (XRD) and Scanning Electron Microscopy (SEM) in order to identify their structure i.e. types of bonds and available functional groups, its crystallinity and the surface morphology respectively. Our FTIR results show that the presence of hydroxyl groups and it is confirmed the formation of hydroxyapatite from apatite. Our XRD data show the reflections corresponding to structure of hydroxyapatite and the microstructural features of products explained through the SEM results. All FTIR, XRD and SEM results were compared with the literature data and it is revealed that the possibility of formation of hydroxyapatite from Eppawala high grade phosphate available in Sri Lanka.

Keywords: Hydroxyapatite, Eppawala high grade phosphate, Sol-gel method, Solid state sintering