

Waste Driven Hydroxyapatite

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Abstract

Hydroxyapatite ($\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$) (HA) is widely used in the medical applications due to its superior bio-friendly properties. In this work we report simple technique to fabricate HA from waste materials. We fabricated HA using three different raw materials; (1) egg shell, (2) coral reefs, (3) sea shells as calcium sources. The materials were cleaned in water and dried under direct sun for a day. Then the raw materials were calcinated using a muffle furnace at 900°C for 2 hours. Calcinated powder was grounded and added into deionised (DI) water. Then the required amount of orthophosphoric acid (H_3PO_4) is added into the mixture and kept under stirring for 15 hours. The precipitate were then collected and washed twice in DI water to remove the excess solvents added. The resultant precipitate is dried at 60°C in an electric oven for 12 hours and dye pressed into pellets. The pellets were characterised by FESEM and XRD. As prepared samples show the nano HA and they agglomerated and spherical shape after sintering at 900°C . XRD pattern showed peaks for crystalline HA, regardless of the raw material used. The increased peaks after sintering indicated that the crystallinity increased after sintering.

Keywords: Hydroxyapatite, Biomaterial, Egg shell, Coral reefs.