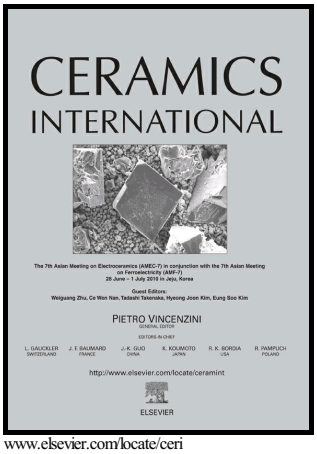

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Abstract

It is well documented that biological hydroxyapatite (HA) differs from pure and synthetically produced HA, and contains of a mixture of calcium phosphate (CaP) phases in addition to a range of impurity ions, such as strontium (Sr^{2+}), zinc (Zn^{2+}), magnesium (Mg^{2+}), fluoride (F^-) and carbonate(CO_3^{2-}), but to name a few. Further to this, biological apatite is generally in the form of rod (or needle-like) crystals in the nanometre (nm) size range, typically 60 nm in length by 5-20 nm wide. In this study, a range of nano-hydroxyapatite (nHA), substituted nHA materials and co-substituted nHA (based on Sr^{2+} and Zn^{2+}) were manufactured using an aqueous precipitation method. Sr^{2+} and Zn^{2+} were chosen due to the significant performance enhancements that these substitutions can deliver. The materials were then characterised using Fourier Transform Infrared Spectroscopy (FTIR), X-Ray Diffraction (XRD), X-Ray Photoelectron Spectroscopy (XPS) and Transmission