Abstract Submitted
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Crystal Structure and Magnetic properties of Fe-substituted nanoscale Hydroxyapatite[1] ANDREAS KYRIACOU, RICCARDO VENTURELLI, KOREY SORGE, THEODORA LEVENTOURI, Department of Physics and Center for Biological and Materials Physics, Florida Atlantic University, Boca Raton FL 33431, USA — Magnetic nanoscale hydroxyapatite (HAp) of chemical formula $Ca_{(5-x)}Fe_x(PO_4)_3OH$ has been prepared by a chemical precipitation method where x varies from 0 to 1.26. Single phase HAp is identified in XRD patterns of samples with $x \leq 0.30$ while maghemite (Fe_2O_3)is formed as a secondary phase for $x \geq 0.60$. The average crystallite size as calculated by the Scherrer equation varies from 16 nm to 28 nm. Rietveld refinement reveals a decrease of the unit cell for $x \leq 0.15$. Magnetic moment measurements as a function of temperature at applied field $\mu_0 H = 1.5$ T shows a two component system: a temperature-dependent paramagnet (PM) or superparamagnet (SPM) and a roughly temperature-independent ferromagnetic (FM) component. No FM activity is shown for low x, followed by increased activity for higher x. Increasing SPM activity is observed for $x \leq 0.60$. Hysteresis measurements show irreversible loops for $x \geq 0.22$.

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