

414e In-Situ Synthesis and Processing of Nano-Hydroxyapatite in Conjunction with Poly(Vinyl Alcohol) and Collagen Based Matrices and Properties of the Resulting Composite

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Composites of hydroxyapatite, HAp, in various types of binders including poly(vinyl alcohol) and collagen can serve in tissue engineering including bone repair and reconstruction tasks. Here nano-hydroxyapatite (n-HAp), was synthesized in poly (vinyl alcohol) (PVA) and collagen upon the use of co-solution and co-precipitation methods. The resulting biocomposites were characterized using spectral techniques and SEM. The use of twin screw extrusion technologies was investigated by employing a 7.5 mm mini-twin screw extruder available from MPR. The HAp crystals could be uniformly distributed in the composite, as various techniques (TGA and wide-angle x-ray diffraction based) designed to assess quantitatively the degree of mixedness of the ingredients revealed. Upon certain processing conditions, the HAp-PVA-gelatin composite generated good homogeneity and high n-HAp content to potentially lead to high bioactivity. The composite samples appeared to be microstructurally and chemically uniform on the surfaces of the interconnected pores of the matrix of the substrate.