

Cellulose Acetate/Polyacrylic Acid Filled with Nano-Hydroxapatite Composites: Spectroscopic Studies and Search for Biomedical Applications

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Abstract : Polymeric biocomposite of hydroxyapatite/polyacrylic acid were prepared and their thermal and mechanical properties were improved by addition of cellulose acetate. FTIR spectroscopy technique and X-ray diffraction analysis were employed to examine the physical and chemical characteristics of the biocomposites. Scanning electron microscopy shows a uniform distribution of HAp nano-particles through the polymeric matrix of two organic/inorganic composites weight ratios (60/40 and 70/30), at which the material crystallinity reaches a considerable value appropriate for the needed applications were studied and revealed that the HAp nano-particles are uniformly distributed in the polymeric matrix. Kinetic parameters were determined from the weight loss data using non isothermal thermogravimetric analysis (TGA). Also, the main degradation steps were described and discussed. The mechanical properties of composites were evaluated by measuring tensile strength and elastic modulus. The data indicate that the addition of cellulose acetate can make homogeneous composites scaffold significantly resistant to higher stress. Elastic modulus of the composites was also improved by the addition of cellulose acetate, making them more appropriate for bioapplications.

Keywords : biocomposite, chemical synthesis, infrared spectroscopy, mechanical properties

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