

FTIR Studies of Carbon Matrices Modified with Nanosized Hydroxyapatite

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Nowadays, high-performance composites are one of the most interesting structural materials which are more and more applied not only in industry but also in medicine. In biomaterials engineering materials exhibiting both biocompatibility and bioactivity play an important role in the case of bone replacement. Such materials are able to form a natural bond with host tissue. Hydroxyapatite (HAp) is known to be bioactive and due to this feature, is widely used as bone tissue replacement. However, its poor mechanical parameters cause difficulties with its application as structural implant. Therefore, we propose to use HAp as a modifier of constructive carbon fibres-based composites.

This work reports the results concerning modification of pitch- based carbon matrices with hydroxyapatite nanoparticles. Isotropic pitch and nanosized HAp mixtures were used as substrates of composite matrices. Concentration of HAp in pitch precursors varied from 1, 5 and 10 wt%. The samples were first oxidized and next subjected to heat treatment at 1000 °C in an inert atmosphere at the mean heating rate of 0.7 °C/min (total time of heating - 24 hour). The study on oxidation and heat treatment products was led by means of FTIR technique in the range from 4000 to 400 cm⁻¹ on FTS-60 V Bio Rad spectrometer. The structure of the samples was carried out on XRD diffractometer (Cu K_α radiation, Ni-filtered). Microstructure of the materials was examined by scanning electron microscopy JEOL 5400 with LINK AN 10000 point microanalyzer of X-ray radiation.

This study of a family pitch – based carbon matrices/HAp provided a basis for selecting an appropriate composition for fabrication of structural carbon composite containing nanosized HAp.

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