

The effect of the natural and synthetic porphyrin complexes on the structure and properties of the semi-crystalline polymers

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Abstract.

Recently, nanocomposite fibrous materials with favorable functional properties are widely used in various fields, for example: conductive fibers, fiber-optic sensors, materials for photonics, gene therapy and biomedicine. The development of modern nanocomposite fibrous materials with valuable functional properties based on biodegradable semicrystalline polymers it is an actual scientific problem. Moreover, the use of natural and biodegradable polymers as objects allows us to approach the solution of an environmental problem, expanding the list of known ecofriendly materials for special purposes, expanding the areas of their practical application, including solving biomedical problems. Thus, the aim of the work is the development of a methodology for the directed design of biodegradable fibrous nanocomposites with specified characteristics. In the article, the methods of directed modification of semi-crystalline polymers of natural origin (polyhydroxybutyrate) by modifying additives based on natural and synthetic porphyrin complexes (tetraphenylporphyrin, metalloporphyrin, hemin) are considered. Electrospinning is one of the most productive ways to obtain a highly developed well oriented structure with specified properties. The influence of additives on the polymeric fibrous structure and, as a result, on the properties of the electrospun material was investigated in the work. The similarities and differences in the patterns of structure formation of the semi-crystalline polymer under the influence of various additives allow us to conclude the possibilities of directional design of the supramolecular structure of the polymer.