

Geterostructures of Bacterial Cellulose Acetobacter Xylinum Intercalated by Drug Materials

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Organic-inorganic hybrid materials based on bacterial cellulose with metal nanoparticles are interesting for medical applications. High-crystal cellulose matrix obtained at static growth of Acetobacter Xylinum (AX) in the process of intercalation of drugs was investigated by methods of small and wide-angle X-ray scattering, electron diffraction, transmission electron microscopy and atomic force microscopy.

The investigation of interaction of polyvinylpyrrolidone (PVP) and germicide preparation Poviargol and Catapol (Ag^o and Se^o nanoparticles stabilized by PVP) with gel-films AX by diffraction methods has shown that besides reflections associated with crystal-state cellulose, in both cases reflections from PVP phase are present. In the case of gel-films AX with Poviargol the reflections are observed from silver. Small-angle X-ray scattering experiments with composite samples allowed us to estimate the relative amount of intercalated PVP, Ag and Se in the process of their desorption by substitution with water, and to determine the size distributions of the nanoparticles. The distributions show relatively large amount of small particles (5-20nm) and minority of larger ones (up to 100nm).

Keywords: electron and x-ray diffraction, bacterial cellulose, organic-inorganic hybrid materials