

Application of a sol-gel method for functionalization of textile materials

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Abstract

Application of a silica sol containing functional nanoparticles allows to obtain thin layers, that after their deposition on textiles impart to them different performance properties.

The cotton-polyester blend woven fabrics were modified with functional nanoparticles. As functional nanoparticles metallic silver and copper (Ag/Cu), TiO_2 and ZnO were used. The bonding agent for fixing functional particles with the surface of textiles was silica sol obtained on the basis of (3-glycidydeoxypropyl)trimethoxysilane, by the "sol-gel" method.

Depending on the type of functional particles used, the cotton-polyester blend woven fabrics were characterized by very good bioactive properties and photocatalytic activity.

The bioactive properties of textiles after deposition of silica sol modified with Ag/Cu nanoparticles by quantitative method were obtained. We obtained a reduction in bacteria and fungi in the range of 89% - 99%.

The photocatalytic activity of textiles after deposition of silica sol modified with TiO_2 or ZnO nanoparticles was determined by colorimetric method. In this method, the ability of the modified textiles to the degradation of dye deposited on the textile surface under UV radiation (302 nm) was investigated. The best effects of photocatalytic activity for textiles after deposition of silica sol containing TiO_2 in the anatase form were obtained.

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