Inorganic Nanosol Coatings for Antimicrobial Treatment of Textiles

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Abstract:

Antimicrobial functionalized textiles are of high interest due to the wide field of potential applications. The antimicrobial properties can protect the textile itself from decomposition by microorganisms. Further points of interest are the suppression and destruction of pathogenic germs or the support during the therapy of neurodermatitis skin or the diabetic foot. This chapter is related to the development of aqueous finishing agents for realization of antibacterial coatings on textiles. The used finishing agents are based on modified silica nanosols which are the coating forming component in the used composition. The second component is responsible for the antimicrobial properties of the coatings. For this antimicrobial agent, a recipe based on natural layered silicate and metal ions of silver, copper and zinc are used. This composite material acts as storage material releasing the antibacterial active metal ions. The antibacterial activity is tested after application on cotton and polyester fabrics by using two different types of bacteria Escherichia coli and Staphylococcus aureus. By variation of the composition of this nanosol finishing agent, the antibacterial activity can be adjusted in a broad range. This might be especially useful for applications requiring an intermediate antimicrobial activity under consideration of the natural skin flora. Besides testing the antibacterial properties, the prepared textile samples are investigated using light microscopy and scanning electron microscopy (SEM), energy dispersive x-ray spectroscopy (EDS) and UV/VIS-spectroscopy. Also the abrasion stability of coatings and textile samples is determined.