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PREPARATION AND CHARACTERIZATION OF NEW MULTIFUNCTIONAL TEXTILES CONTAINING TiO₂ NANOFIBERS

This work presents the preparation of multifunctional cotton textiles using TiO₂ nanofibers. The obtaining of single-crystalline TiO₂ nanofibers with high specific surface area synthesized by electrospinning technique with controlled crystal structure and morphology. The nanofibers were annealed at 500 °C in a controlled atmosphere in the presence of air for two hours to achieve crystalline phase transformation. The cotton fabrics were functionalized with different concentrations of TiO₂ nanofibers by ex situ method. The surface energy of the cotton fabric was modified using hexadecyltrimethoxysilane. Fabrics with superhydrophobic, antibacterial, UV protection and photocleaning properties were obtained. In this research, the results of the characterization of the samples using SEM, EDS, transmittance spectroscopy and contact angle measurement techniques are presented. The results showed that the modified cotton has potent antibacterial activity against *Staphylococcus epidermidis* bacteria. Modification of the textile surface composition was successfully carried out. Ultraviolet light blocking was measured by transmittance data at 280-400 nm and showed a higher ultraviolet protection factor than pristine cotton, it also presents a static contact angle with water > 150° for a 5 µl droplet.

Keywords

Textile, Nanofibers, Multifunctional, Electrospinning

Reference

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Author approval

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