

IMPROVEMENT OF UV PROTECTION PROPERTIES OF THE TEXTILE FROM NATURAL FIBRES BY THE SOL-GEL METHOD

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In this research pure cotton textile has been modified by the sol-gel technology to implement zinc oxide nano-level coating on textile surface to ensure ultraviolet (UV) radiation protection.

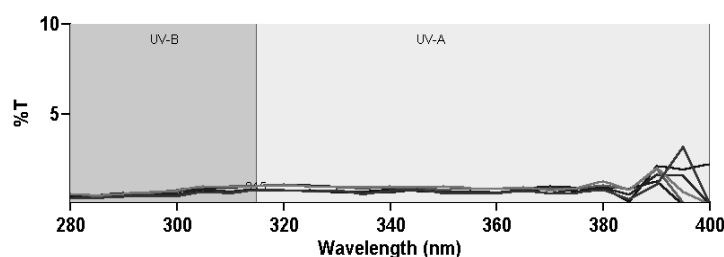


Fig.1 UVA and UVB transmission graphic after sample treatment.

One of the advantages of this method is the possibility to obtain thin layers on various materials, as well as the sol-gel layers can cover all fibres with enough high adhesion. Comparison of coatings of samples prepared using different concentrations of TEOS in nano-sols and thermal post-treatment of samples was made. Scanning electron microscopy (SEM) has been used to examine the nature of the surface modification after textile coating and laundering tests. Before and after laundering UV protective properties of the fabric samples were determined according to the standard, results show that textiles after treatment with nano-sol have excellent UV protection properties (UPF rating 50+ according to the standard - excellent protection). Analyses based on the SEM and spectrophotometer measurements show that obtained textile coatings are distributed evenly, not only on surface of yarns but in the depth of textile material as well, and are resistant to exploitation processes. After 50 drying-washing cycles defects of coatings not observed, the UPF ratings are still 50+ UPF that testify that treated fabric after exploitation simulation still provide excellent UV protection.

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