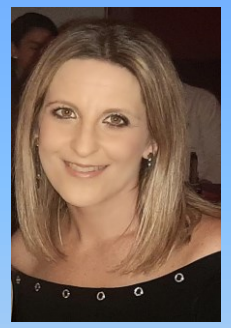
NanoAlb - WEBINAR

Multifunctional textile materials obtained by in situ synthesis of Cu-based nanoparticles



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Cellulose-based fibers having a high number of available functional groups (hydroxyl, carboxyl, etc.) are appropriate candidates for in situ synthesis of Cu-based nanoparticles (NPs). Such synthesis usually takes place in two steps: the fibers (untreated or pretreated) were immersed in copper sulfate solution and then immediately dipped in the reducing agent. The most frequently used reducing agents are sodium borohydride, ascorbic acid, and natural extracts. The existence of Cu-based NPs on the fibers' surfaces could be assessed by SEM, while their structure (metallic Cu, copper oxides Cu2O or CuO or their mixtures) could be verified by XRD. Coating with Cu-based NPs has been widely used for cellulose fibers' functionalization since the Cu-based NPs possess catalytic, antimicrobial, anticancer, and antioxidant activity or cytotoxicity. In the latest published data, coating with Cu-based NPs was used to improve some dielectric properties (effective relative dielectric permeability and dielectric loss tangent) of chemically treated jute fabrics (Ivanovska et al. 2022a) as well as volume electrical resistivity and antioxidant activity of cotton and cotton/elastane knitted fabrics (Ivanovska et al. 2022b). The obtained results indicated that the mentioned properties are in good relation with the total content of Cu (proven by ICP-OES) after the reduction.

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