Textile impact plates for the study of nanoparticle influence on health

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Nanoparticles have a wide field of application in consumer spray products for example in waterproofing sprays but have not yet been extensively studied [1-2].
The paper presents textile materials intended for impact plates with different surface architectures treated with active ingredients for functionalization which may influence the aging process of nano-Ag and nano-CeO_2 [3]. The woven and knitted samples from 100% cotton were treated by impregnation and spraying. The laboratory padding machine, drying and condensing on the machine for drying-condensing-heat setting, with the following recipes: 50g/l RUCOSTAR EEE6+20 ml 5% nano-Ag dispersion, or 10% nano-CeO2 in ethylene glycol, respectively water and 0,5ml acetic acid 60% for products from 100% cotton.The samples were treated in 2 steps – hydrophobic / oleophobia in the first stage in hydrophobic / oleophobia /functionalization with nano-Ag and nano-CeO_2 in the second stage.

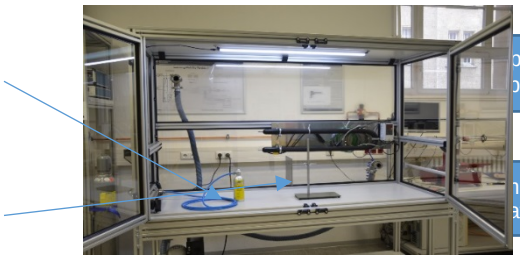

Fig.1-Test rig

Textile samples were sprayed by various nanoparticle suspensions and subsequent characterised. Experiments were carried out with different suspensions, based on different solvents and different kinds of CeO_2 particles either in the nanometre size range or in the micrometre size range as well as micrometre sized Ag particles and textile samples (i.e. hydrophobic and oleophobic cotton, 21cm x 21cm). Inside experimental test rig (figure 1) the textile samples were mounted on a vertically aligned impaction plate that was placed in a distance of 30 cm to the spray can outlet, as recommended for application of waterproofing sprays. Spray application was performed for 5 s with a compressed-air driven spray can (Model SG700, HVG-Druckluftzubehör, Weitefeld, Germany) at 6 bar system pressure within a ventilated spray chamber (chamber volume 1.5 m³, air exchange rate 17.6 hr^{-1}) that was operated in air circulation mode after purging (background particle number concentration < 10 #/cm³). Afterwards, the textile samples were removed from the spray chamber, dried in laboratory air and were characterised.The complex characterization both of type materials : hydrophobic and oleo phobic properties, color change, whitening degree, DCS, FT-IR, SEM [4].
were carry out.

References

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