

Evaluation of Cotton Fabrics Hydrophobization by Functionalized Silica Nanoparticles

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Hydrophobic silica has been used in an extensive range of scientific and technological applications, including the chemical finishing of textiles, removal organic contaminants from wastewater, as well as the potential in drug delivery. The specific applications of these nanoparticles are highly dependent of the size and distribution. In this context, the sol-gel method was used to obtain SiO₂ nanoparticles with range size from 90 to 190 nm, modifying the ethanol/water ratio in a reactive system containing tetraethyl orthosilicate (TEOS). The particles were submitted to structural and morphological analyses and functionalized by silanization. After silanization, the impregnation of the cotton fabrics was performed by dip-coating method. The presence of the functionalized groups (silane) onto the particles surface was characterized by Fourier transform infrared spectroscopy (FTIR). The hydrophobicity of the impregnated fabrics by SiO₂ nanoparticles was evaluated by contact angle, presenting a range values from 112° to 150°.