

Synthesis of zinc oxide nanoparticles and its applications in the surface modification of textile materials

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The application of nanotechnology in the textile finishing is increasingly being explored due to its unique and valuable characteristics. This has brought up many innovative finishes as well as new application techniques. The nano-finished textile materials are found to have better physical properties than the conventionally finished textiles, in areas such as anti-microbial properties, UV blocking, soil-resistance, etc. In the present work, zinc oxide nano-particles were prepared by wet chemical method using zinc nitrate and sodium hydroxide as precursors and solublized starch as stabilizing agent. These nano-particles were impregnated onto cotton fabrics by pad-dry-cure method using acrylic binder. A fine medium weight cotton fabric samples were used for this. The aims are to impart anti-microbial functions to the textile substrate and the functional properties of coated fabrics. The nano-ZnO impregnated cotton fabrics showed excellent antimicrobial activity against two types of representative bacteria viz. gram-positive organism (*S.aureus*) and gram-negative organism. (*E. coli*).

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1. Introduction

Over recent years one can observe increasing interest in the antibacterial finishing of textiles, many textiles currently used in hospitals and hotels constitute a potential source of infection and disease caused by micro-organisms as a result of secondary infection. Medical and hygienic applications of textiles have become important areas in the textile industry. Antimicrobial properties can be imparted to textiles by physical or chemical treatment with appropriate agents. Textile materials with such properties are grouped into two categories, i.e. fabrics with unstable properties and those durably functionalized. Unstable bio active properties can be easily obtained by finishing processes, but they are quickly lost during laundering. In this case antibacterial agents are incorporated into textile in the process of wet finishing. The antibacterial properties of textiles decay if the fabrics are impregnated with antibacterial agents only, with no covalent bonds between each other. zinc oxide antiparticles which have an average size of 40 nm, were coated on the bleached cotton fabrics (plain weave, 40 s count) using acrylic binder and functional properties

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