Title

Development of Longer-Lasting Insect Repellence Cellulosic Based Curtain Fabrics

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Abstract:

Long lasting insect repellent curtain fabrics were developed and characterized. Different types of fabrics which are generally used in manufacture of curtain fabrics were functionalized with monochlorotriazenyl β-cyclodextrin (MCT- β-CD) then treated with different concentration from permethrin to impart the fabric insect repellent properties. These fabrics were 100% cotton, cotton/viscose, cotton/linen, polyester/cotton, polyester/linen and polyester/viscose blend fabrics. The treated curtain fabrics were evaluated for insect repellent retention capacity against mosquitoes. The repellent efficacy comprises the determination of percent mosquitoes repelled, knockdown and killed (mortality) resulting from exposed mosquitoes to the treated fabric. Results obtained shows that, the insect repellent retention capacity of curtain fabrics functionalized with R-β-CD then treated with permethrin depends on the amount of β-CD moieties on the curtain fabrics, type of fabric and permethrin concentration. Higher action is obtained when the fabric was functionalized with 100 g/L, MCT-β-CD in alkaline medium followed by treatment with 15 g/L permethrin. The results show also that, curtain fabric made of cotton/linen shows highest mosquitoes repellent retention capacity and highest resistance against washing compared with 100% cotton or cotton/viscose or polyester based curtain fabrics. The insect repellent treatment of curtain fabrics did not adversely affect the tensile strength or drapability index of curtain fabrics.

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Title

Achieving Optimum Scientific Standards for Producing Fabrics Suitable for Protecting Against Hazardous Chemical Liquids

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Abstract:

Occupational exposure of the skin to toxic chemicals is a recognized health problem so chemical protective clothing is considered the most important line of defense to the worker who is exposed to the hazardous chemicals. This research aims to produce fabrics suitable for protecting against hazardous liquids (accidental splashes of chemicals). All samples under study were produced cotton and cotton /polyester 50/50. Three weft sets were used 24, 27 and 30 picks/cm and three fabric structures (plain weave 1/1, twill 2/2 and satin 4). Samples were coated, from one face, with Transol® F L-20, to make the fabric repellent and a barrier to protect against hazardous chemical liquids. Their influence on the performance of the end-use fabric and the achieved properties were studied. On the other hand physic-chemical properties including, studying the effect of some hazardous liquids chemicals using Gutter method, tensile strength and elongation, water absorption, roughness, thickness and weight were evaluated according to the final product needs. Some more results were reached concerning structures and materials. Most samples have achieved the expected results.

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Title:

Effect of Some Construction Factors on Fabrics Used in Traveling Bags

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ABSTRACT

Fabrics are often utilized in the construction of various types of bags, specially traveling bags, where strength, flexibility and durability are important. The aim of this research is to produce woven fabrics suitable for being used in traveling bags. All samples under study were produced of polyester yarns 50, 70 and 100 denier .Three weft sets were used 60, 80 and 100 picks /cm and three fabric structure (plain weave 1/1, twill 1/4 and satin 5). Samples were coated using P.V.C in order to produce a waterproof, moisture vapor permeable laminated fabrics and having perforation to provide ventilation to the user. The influence of previous parameters on the performance of the end-use fabric was studied. On the other hand physico-chemical properties including, tensile strength and elongation, abrasion resistance, water permeability, water repellency, tear resistance, thickness and weight were evaluated according to the final product needs. Some more results were reached concerning structures and materials. Most samples have achieved the expected results.

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4 st Paper

Title:

Effect of Weaving Construction Parameters of PES/ Metallic Woven Blend Fabrics on their UV Protection Characteristics

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Abstract:

Long-term exposure to UV light can result in acceleration of skin ageing, photo-dermatosis, erythemal, sunburn, increased risk of skin cancer, eye and DNA damage. Clothing can provide convenient personal protection. However not all fabrics offer sufficient UV protection. Ultraviolet Protection Factor (UPF) of fabrics depends on fabric materials, and fabric construction. Choosing suitable fabric type and construction are deemed to present the simplest and cheapest solution to achieve good personal UV protection without additional finishing processes. The present study aims at developing UV protective fabric based on polyester and metallic yarns. The effect of number of weft yarns thereof and fabric constructions on the ultimate UPF of the produced fabrics were investigated. For this regard, two kinds of yarn materials were chosen to construct fabrics, namely, polyester PES and metallic yarns. 100 % PES yarns were used for warping, whereas weft yarn were verified with three different blending ratios namely, 100 %, PES, 50/50 PES/metallic and 100 % metallic. For each blending ratio three kind of construction and picks number were exploit. The fabrics were monitored for UPF, scanning electron microscopy and EDX. The results show that, highest UPF (93.3) was obtained with fabric made from: 100 % PES warp yarn and metallic/polyester (50/50) weft yarn, constructed using satin weaving construction with picks number of 28 pick/cm.

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Title:

Novel Technological Method for *in situ* Deposition of Zinc Oxide Nanoparticles onto Curtain Fabrics for Superior UV Protection

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ABSTRACT

Novel and simple technique for imparting cellulose-based curtain fabrics superior ultraviolet protective properties by *in situ* deposition of zinc oxide nanoparticles from zinc acetate onto alkali pre-treated fabrics was developed. The reducing properties of alkaline cellulose was exploited to reduce Zn acetate to zinc oxide nanoparticles at higher temperature. Cotton based curtain fabric used in this study were 100% cotton, cotton/ viscose, cotton/lined, cotton/PES, PES/ viscose and PES/linen blend fabrics. The most appropriate conditions for this novel and simple technique, included type of yarn used in manufacture of the fabrics, concentrations of NaOH and Zn-acetate, curing time and temperature were investigated. The fabrics were monitored for ultraviolet protection factor (UPF), tensile strength, elongation at break as well as scanning electron microscope (SEM), electron diffraction x-ray (EDX) and X-ray diffraction (XRD). Results obtained show that, the UPF of the treated fabrics attained its maximum values when the fabrics were treated with 3 % NaOH then dried at 85 °C for 5 min. The alkali treated fabrics were then treated with 4 % Zn-acetate, and cured at 110 °C for 5 min. The ultimate UPF of the treated fabrics depends on the fabric type. Treated PES/linen blending fabric shows the maximum UPF (82) whereas the treated 100 % cotton fabric shows the lowest UPF values (55.3). These values of UPF are much higher than those UPF values before treatments (4.1 and 19.1 respectively). XRD of the fabrics after *in-situ* precipitation of ZnO nanoparticles shows that, the size of the formed ZnO crystals ranging from 0.24-0.44 nm and the particles shape were hexagonal or cubic depending on the fabric type.

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6 st Paper

Title:

Assessment of the Electrostatic Propensity of PES / Metallic Woven Fabrics

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Abstract:

Although the field of electrostatics has been known for years, many of the phenomena associated with it are still not understood. This has led many authors to state that electrostatics is both a science and an art. Static charge has been a major source of problem in textile industry as well as consumers. Static problems in textile industry have become more serious as synthetic fibers and higher processing speeds are met. This research was undertaken to gain better understanding of electrostatic propensity of polyester / metallic woven fabrics . A total of twenty seven woven fabrics were produced in three different weave types (sateen 8 , 4/4 hopsack and Kautshok) from (100% polyester , 100% metallic and (50% polyester , 50% metallic) (1 pick : 1 pick)) weft blend , 100% polyester warp , of three different weft set (22 picks/cm , 28 picks/cm , 34 picks/cm). The test results obtained showed that the amount of generated static charges showed great variance according to: the type of material (The maximum static charges were at 100% polyester) , type of weaving in 100% PES weft in the woven fabrics (The maximum static charges was for 4/4 hopsack.

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7 st Paper

Title:

Effect of Weaving Construction and Blending Ratio on Self-Cleaning Properties of Polyester and Polyester/Cotton Blend Fabrics Treated With TiO_2 Nanoparticles

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Abstract:

Self-cleaning finishing of polyester fabrics (PES) with TiO2 NPs aims at overcome its inherent soiling tendency compared with other natural fibres. However, although sunlight rays are present virtually everywhere, there are certainly many factors affecting the intensity of the rays and its accessibility inside the fabrics, which should have a direct impact on the efficiency of self-cleaning reactions of PES fabric treated with TiO2 NPs. In this work the effect of weaving construction of PES fabrics and its blend with cotton yarn that verify higher self-cleaning efficacy after treatment with TiO2 NPs was investigated. For this regard, two kinds of yarn materials were chosen to form fabrics with three different blending ratios. For each blending ratio three kind of weaving construction and picks number were exploit. The samples were treated with TiO2 NPs and monitored for self-cleaning properties. Results obtained shows that, the highest degree of self-cleaning properties was observed with satin-4 weaving construction, whereas plain 1/1 weaving construction verifies the least degree of self-cleaning. Twill 4/4 weaving construction verifies intermediate values. It is also observed that, at the same weaving construction, increasing the picks number from 24 to 36 pick/cm leads to decrement in degree of self-cleaning properties of the fabrics. It is further noted that, at the same picks number and weaving construction, 100 % PES fabrics treated with TiO2NPs achieve highest self-cleaning properties.

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Title:

Effect of Self-Cleaning Treatment on Some Physico-Mechanical Properties of Woven Polyester and Polyester/Cotton Blend Fabrics

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Abstract:

Self-cleaning textiles have recently received much attention due to their convenience of less soiling, and thus less laundering. TiO_2 NPs is used to impart textile material self-cleaning characteristics. When TiO_2NPs is coated on textile polymers, its inherent photo-catalytic activity decomposes the polymeric textile materials, as well as the contaminants. Fabric material and its weaving construction are expected factors that able to mitigate the deterioration of mechanical strength of the treated fabrics under the photocatalytic activity of TiO_2NPs. The present work aims at investigating the effect of self-cleaning treatment on some physico-mechanical properties of woven polyester and polyester/cotton blend fabrics. Three kind of woven constructions were chosen namely, Plain 1/1, Twill 4/4 and Satin 4, each one were weaved using two types of picks number 24 and 36 picks/cm. Self-cleaning treatments of polyester (PES) and polyester/cotton blend fabrics was carried out using TiO_2NPs with binder and realized under the effect of direct sunlight. The fabrics were monitored for physico-mechanical properties and self-cleaning efficacy after the exposure to sunlight. Results obtained indicated that, at the same weaving construction and fabric types, the fabric tensile strength, elongation at break and surface roughness after self-cleaning treatments is higher than before treatment. Moreover, at the same weaving construction, 100% PES fabrics show the highest tensile strength and elongation at break as well as surface roughness compared with PES/cotton blend. It is further observed that, at the same fabric material and picks number, Plain 1/1 weave construction give higher tensile strength compared with Twill 4/4 and Satin-4 meanwhile, the surface roughness of the three weaving construction show the following order: Plain 1/1 > Twill 4/4 > Satin 4.

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