

### Izvirni znanstveni članek *Original Scientific Paper*

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### Preiskava kemijskih sprememb na površini PET pletiva z rentgensko fotoelektronsko spektroskopijo po obdelavi s korona plazmo in po staranju pletiva

*X-Ray Photoelectron Spectroscopy Characterisation of Chemical Changes on PET Knitted Goods Surface after Corona Treatment and Ageing*

Z rentgensko fotoelektronsko spektroskopijo (XPS) smo preiskali poliestrno (PET) pletivo pred obdelavo in po njej v atmosferski korona plazmi. Izvedli smo tudi preiskavo kemijskih sprememb plazemsko obdelanih vzorcev po staranju. PET-pletivo je bilo enostransko obdelovano v korona zračnem atmosferskem plazemskem aparatu pri moči generatorja 900 W v 30 in 60 ciklih. Rezultati študije kažejo, da na površini vzorcev koncentracija kisika in delež vezi med atomi C in O po obdelavi v korona plazmi vidno narasteta (razmerje O/C se zviša z 0,31 na 0,53–0,61). To kaže, da korona plazma povzroči na površini visoko koncentracijo funkcionalnih skupin, ki vsebujejo kisik. Enodnevno staranje vzorcev v Xenotestu ne kaže posebnih sprememb v sestavi površin, enomesečno staranje vzorcev v Xenotestu pa pripelje do znatnih sprememb na površini. Koncentracija kisika se močno zniža, razmerje O/C na plazemsko obdelanih vzorcih pa pade z 0,54–0,61 na 0,13–0,16.

**Ključne besede:** PET pletivo, atmosferska korona zračna plazma, XPS, kemijska sestava površine

*Polyester knitted goods treated with atmospheric corona plasma were investigated with X-ray photoelectron spectroscopy. The surface composition and chemical bonding of surface atoms were analysed after the plasma treatment and subsequent ageing of samples. The PET knitted goods were one-side treated in a corona air atmospheric plasma apparatus operating at 900 W power of the generator, regulated with the number of passages set to 30 and 60. The results of the study show that the oxygen concentration and the content of carbon-oxygen bonds on the sample surfaces after the corona plasma treatment substantially increase (ratio O/C increases from 0.31 to 0.53–0.61). This demonstrates that the air corona plasma treatment induces a high concentration of oxygen containing functional groups on the treated surface. The one-day ageing in Xenotest does not cause any significant changes in the composition, while the one-month ageing of samples in Xenotest leads to considerable surface changes. The oxygen concentration decreases dra-*

*atically, the ratio O/C namely falls from 0.54–0.61 to 0.13–0.16 for the plasma-treated samples.*

**Keywords:** PET knitted goods, atmospheric corona air plasma, XPS, surface chemical composition

### Pregledni znanstveni članek *Scientific Review*

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### Geometrijski modeli votkovne zanke: ohlapna, normalna in zbita struktura

*Geometrical Models of Weft Knitted Loop: Open, Normal and Closed Structure*

Znanstveniki so že v prvi polovici 20. stoletja na podlagi študija temeljne celice pletiva – zanke analizirali levo-desno pleteno strukturo in poskušali z modeli opisati razmerja med parametri preje in pletiva ter procesnimi parametri pletenja. Prvi geometrijski modeli so odigrali pomembno vlogo pri nadzorovanju dimenzij in ploščinske mase pletiva, sodobnejši pa so namenjeni grafičnim simulacijam in projektiranju pletene strukture. Resnična pletiva so kompleksni materiali, ki ne ustrezajo uporabljenim idealiziranim predpostavkam: strukturna homogenost, nestisljivost in preprosta geometrija. Študij geometrije zanke je v zadnjem času ponovno predmet raziskav, npr. za potrebe nogavičarstva, računalniških simulacij videza pletiva, projektiranja kompozitnih tekstilij ter pletenih struktur z nekonvencionalnimi lastnostmi. Nova spoznanja ter sodobne preskuševalne in merilne tehnike, npr. elektronska mikroskopija in računalniška slikovna analiza, omogočajo opis oblike in dolžine zanke v odvisnosti od geometrijskih parametrov zanke. Opisani in analizirani so najznačilnejši in najpomembnejši konstrukcijski geometrijski modeli zanke votkovnega pletiva.

**Ključne besede:** model zanke, zanka, pletena struktura, dolžina zanke

*In the first half of the 20th century, scientists analyzed the single knitted structure through the studies of the knitted structure basic element, i.e. the knitted loop. By means of loop models, they tried to define the relationships among yarn parameters, knitted fabric parameters and knitting process parameters. The first geometrical loop models played an important role in the control of knitted fabric dimensions and mass per unit area, while the contemporary ones have been designed for graphic simulations and knitted structure planning. The real knitted fabrics are complex materials which do not meet the applied idealized presumptions, i.e. structural homogeneity, non-compressibility and simple geometry. Recently, the studies of the knitted loop geometry have been a research subject once again, e.g. for the demands of the hosiery sphere, computer*

simulations of the knitted fabric appearance, planning of knitted composites and knitted structures with unconventional properties. New expertise, modern testing and measuring techniques, e.g. electron microscopy and computer picture analysis enable the specification of the loop shape and size in dependence on the geometrical parameters of the loop. In the present study, the most distinctive and important constructional geometrical weft loop models are presented and analyzed.

Keywords: loop model, loop, knitted structure, loop length

### Strokovni članek *Professional Paper*

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### Ekomoda

*Eco fashion*

Prispevek opisuje strategije in načela ekomode. Definira pojem trajnostne mode in drugih sorodnih terminov, kot so eko, organska in etična moda, ki jih sicer pogosto zamenjujemo med seboj. Predstavljene so temeljne strategije, ki pripomorejo k zmanjšanju negativnega vpliva tekstilne in modne industrije na okolje. Predstavljeni so inventivni oblikovalci, ki s svojim delom dokazujejo, da so tudi ekoizdelki dobro oblikovani ter naših nakupnih odločitev ne omejujejo na izbor med lepim in okolju prijaznim. Modna industrija kot eden večjih onesnaževalcev okolja mora prevzeti odgovornost in začeti aktivno sodelovati pri uvajanju načel trajnostnega razvoja. Predstavljena sta tudi dva projekta, ki se ukvarjata s problemi modne industrije. Namen projekta €€\$ je ozaveščanje o pomenu in možnostih okolju prijaznega oblikovanja, saj prinaša ustvarjalne rešitve, s katerimi lahko zavrženim oblačilom podaljšamo uporabnost in dodamo novo vrednost. Mednarodni projekt Edu fashion pa predstavlja alternativne možnosti delovanja v modni industriji za vzpostavitev novega, trajnostnega poslovnega modela v modi.

Ključne besede: trajnostni razvoj, ekomoda, oblikovanje za okolje, Edu fashion

The paper describes the strategies and principles of eco fashion. It defines the term sustainable fashion and other related terms, e.g. eco, organic and ethical fashion, the use of which is frequently misused. Moreover, the basic strategies to reduce the negative impact of the textile industry on the environment are presented. The paper also highlights the innovative designers whose work demonstrates that eco products can be very well designed and stylish, and that our purchasing decisions are not limited to the selection between beautiful and environmentally friendly items. The fashion industry, as one of larger polluters, should take the responsibility and start following the principles of sustainable development. Two projects that deal with the problems of the fashion industry are presented as well. The purpose of the project € € \$ is to raise the awareness of the importance and potential of environmentally

friendly design by showing creative solutions which extend the usefulness of discarded clothing and add a new value to them. The international project Edu fashion represents the alternative possibilities of the fashion industry activities with the purpose of creating a new, sustainable business model in the fashion industry.

Keywords: sustainable development, eco fashion, design for environment, Edu fashion

### Strokovni članek *Professional Paper*

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### Oblikovanje in razvoj multifunkcionalne tekstilne forme

*Design and Development of Multifunctional Textile Form*

Prispevek opisuje zasnovo in izdelavo ročno pletenega cevastega šala, ki je multifunkcionalna tekstilija, ker ga je mogoče preoblikovati v različne tridimenzionalne oblike, obenem pa upodablja Kras, kot ga vidi in občuti prva avtorica, diplomantka univerzitetnega študijskega programa 1. stopnje Oblikovanje in tekstilni materiali. Kras in ročno pletenje jo spremljata od otroških let, zato je nastala tekstilija tudi odraz nje same. Multifunkcionalna tekstilija je unikatni izdelek, namenjen sodobni ženski, ki ga lahko samostojno nadgradi oz. preoblikuje, saj sama tekstilija ne navede k natančno določeni uporabi ali obliki. Pletena tekstilna oblika se je izkazala za vsestransko uporabno, saj jo lahko uporabimo kot celovito oblačilo, oblačilni kos ali celo kot tekstilijo za interier.

Ključne besede: oblikovanje tekstilij in oblačil, pletivo, pletenine, multifunkcionalnost, ekologija, Kras, ruj (Continus cogygria)

The paper describes the design and realisation of a hand-knitted tube-shaped scarf representing the multifunctional textile form, which can be reshaped into various three-dimensional forms. At the same time, the scarf represents the Karst as the first author sees and feels it. Both the Karst and hand knitting have been accompanying her since she was a child. Therefore, the created textile form can also be seen as a reflection of her personality. The multifunctional textile form is a unique product, designed for a modern woman who is capable of reshaping the scarf, as it is not intended to be used only for a specific occasion or in a specific shape. The knitted textile form proved to be a versatile textile product, which can be used as a piece of clothing or for interior use.

Keywords: design of textiles and clothing, knitted fabric, knitwear, multifunctionality, ecology, Karst, smoke tree (Continus cogygria)