Approaches about numerical simulation of surface engineering for some natural polymer fibrous system

Vrinceanu Narcisa
Lucian Blaga University of Sibiu, Romania

Surfaces of bamboo derived cellulosic fibrous systems have been modified by air-plasma treatment.

Their deformational response was studied to establish the relationship between their three-dimensional profile and permanent deformation as a measure of their comfort properties since the fibrous system made of natural polymer comes into contact with the skin. The composite should have a permanent deformation close to zero, in order to be, in terms of dimensions, as stable as possible. By analyzing the area of 1 cm^2 using a Universal Surface Tester (UST), different 3D surface diagrams and surface roughness values were obtained. This type of surface investigation provides relevant information about the permanent deformation response of the studied surface, for comfort purposes. The deformation responses and roughness levels were studied (the roughness being the parameter quantifying the 3D geometry of the systems surface). The effect of air-plasma surface modification on the deformation response of bamboo derived cellulosic fibrous systems and optimization of their 3D surface structure to enhance comfort-related properties proved to be substantial. The surface modifications induced by air-plasma treatment are in a good correlation with the mechanical behavior. As expected, the roughness levels of samples studied, using ball sensors are higher than those of specimens scanned using a papillary sensor. Knitted polymer fibrous matrix T1 shows a roughness level of 773 µm resulting from analyses using the ball sensor, while using the papillary sensor it was 102 µm, 86.8% less than before. The analysis of the dimensional stability of knitted polymer fibrous systems was performed by scanning with the papillary sensor, since it provides information comparable with human perception concerning the architecture of the sample surfaces.

Speaker Biography

Vrinceanu Narcisa has completed her PhD at the age of 30 years from "Gh. Asachi" Technical University of Iasi, Romania. She completed a post-doc programme of three years at "Al.I.Cuza" University of Iasi, Romania, in the field of Nanotechnology and Materials Chemistry in Environment Protection. She is working as Lecturer at "L.Blaga" University of Sibiu, Romania, with the main subjects: Textile Fibers Investigation, Garments Comfort, Textile Engineering, Conventional and non-standard Textile Finishing, Environment Chemistry, Transfer Phenomena, Basics of Chemistry. She has expertise in research-development-innovation projects at "L.Blaga" University of Sibiu, Romania. She has more than 200 publications that have been cited over 200 times, with an H-index of 6 and has been serving as an editorial board member of reputed Journals.

e: vrinceanu.narcisai@ulbsibiu.ro

Notes: