

AIR VORTEX ELECTROSPINNING METHOD FOR NANOFIBER YARN PRODUCTION

Mihkel Viirsalu¹, Natalja Savest¹, Andres Krumme¹

¹*Institute of Materials and Environmental Technology, Tallinn University of technology,
Ehitajate tee 5, 19086 Tallinn, Estonia*
e-mail of presenting author: mihkel.viirsalu@ttu.ee

Smart textiles are going to change the future of clothing and the fabrics with new technologies, in addition to covering us or giving protection from the environmental elements, will provide new functions such as communication or energy transformation/ conduction. One problematic issue is to create flexible digital circuits which would be comfortable to wear as well. In best condition, they should be fibrous and possible to weave into fabrics.

This paper presents new approach for preparing continuous uniaxially aligned nanofiber yarns using rotary moving air column. In comparison with previous approaches to nanofiber yarn production, every kind of contacts between fibers and any mechanical object before fiber bundle formation are avoided. Bundles are twisted to yarn by twisting mechanism and collected on spool. Yarns with average diameter of 150 μm were produced at the maximum speed of 36 m/min. Observations under scanning electron microscopy confirmed alignment and high twist level of the fibers. With this method it is possible to produce multilayered yarns as well. Multi-walled nanofiber yarns could be utilized for example in yarn double-layer capacitor production. These kind of fibrous capacitors are highly flexible and possible interest for smart textile industry.



Euroopa Liit
Euroopa
Regionaalarengu Fond



Eesti
tuleviku heaks