GHENT UNIVERSITY	Sint-Pietersnieuwstraat 41 9000, Gent Belgium +32 (0)9 331 01 01 http://www.ugent.be/tw/appliedphysics	
Ghent University is a top 100 university and one of the major Belgian universities counting over 41,000 students and 9,000 employees. Located in Flanders, the Dutch-speaking part of Belgium and the cultural and economical heart of Europe, Ghent University is an active partner in national and international educational, scientific and industrial cooperation.	**Contact:** Anton Nikiforov +32-(0)9-264 38 28 Anton.nikiforov@ugent.be	

Antibacterial composite coatings of metal nano-particles on textiles and plastics for medical applications.

A. Nikiforov [1], I. Kuchakova[1], M. Vanneste[2], P. Heyse[2], M. De Vrieze[2], A. Zille[3], Gh. Dinescu[4], B. Mitu[4], U. Cvelbar[5], Ch. Leys[1]

[1] Ghent University, Sint-Pietersnieuwstraat 41, 9000, Belgium

[2] CENTEXBEL, Technologiepark 7, BE-9052 ZWIJNAARDE, Belgium

[3] 2C2T - Centre for Textile Science and Technology,University of Minho, Campus de Azurém, 4800-058 Guimarães, Portugal

[4] National Institute for Lasers, Plasma and Radiation Physics and Faculty of Physics, University of Bucharest, IO7

[5] Jozef Stefan Institute, Jamova Cesta 39, Ljubljana 1000, Slovenia

Non-woven textile materials with antimicrobial properties are of high demands for applications ranging from medical dressing to everyday cleaning products. We proposed plasma assisted route to engineer polymer films and non-woven fabrics with antimicrobial nano-composite coatings. Atmospheric pressure plasma is used for deposition of nano-composites. Nano-particles Ag, Cu and ZnO are tested as antimicrobial agents with average nano-particles size of about 50 nm. Nanoparticles are incorporated in between two layers of organosilicon film with impregnation process or alternatively through aerosol injection step. Incorporation is made in “sandwich-like structure” where top layer coating (barrier) of 5 - 50 nm thickness is used for precise control of metal ions release and reservation layer of about 200 nm is used for NPs load. The effect of the barrier coating on surface concentration of nano-particles is determined with XPS method. It is shown that increase of the thickness of the barrier layer from 5 to 25 nm leads to decrease of Ag content from 0.24 to 0.08 at. %. Similar effect is found for nano-particles of Cu and ZnO. Antibacterial efficiency of the samples against *P. aeruginosa ATCC 9027* and *S. aureus M u50* bacteria shows that all treated samples exhibit higher antibacterial efficiency against *S. aureus*. The antibacterial efficiency of AgNPs and CuNPs is above 90% which is practically interested for medical application while ZnONPs shows lower antibacterial efficiency. Cytotoxicity of the coatings and materials is investigated for different deposition conditions and analyzed in terms of possible medical applications.

This work is supported by the M.Era-Net project IWT 140812 “PlasmaTex”.