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Making the hospital a safer place by the sonochemical coating of all its textiles and medical devices with antibacterial nanoparticles

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Sonochemistry is an excellent technique to coat nanomaterials on various substrates, imparting new properties to the substrates. After a short demonstration of coating NPs on ceramics and stainless steel, the author will present the coating of textiles such as polyester, cotton, and nylon. In all cases a homogeneous coating of NPs was achieved. Lately, the FDA shows less enthusiasm towards nanoAg, as a result, we have moved to NPs of ZnO, and CuO as antibacterial agents. They were coated on the above-mentioned fabrics and showed excellent antibacterial properties. The coated textiles were examined for the changes in the mechanical strength of the fabric. A special attention was dedicated to the question whether the NPs are leaching off the fabric when washed repeatedly. The coated ZnO NPs on cotton underwent 65 washing cycles at 92°C in water in a hospital washing machine, no NPs were found in the washing solution and the antibacterial behavior was maintained. Recently, an experiment was conducted at Pirogov Hospital in

Sofia, Bulgaria in which one operation room was equipped with antibacterial textiles, namely, bed sheets, pajamas, pillow cover, and bed cover. Twenty patients in this operation room were probed for bacterial infections. Their infection level was compared with 17 control patient that were using regular textiles. The results demonstrate that a lower infection level is observed for those patient exposed to the antibacterial textiles. The following medical devices were coated with metal oxide nanoparticles and showed very good biocidal properties and inhibition of biofilm formation 1) urinal catheters 2) contact lens 3) cochlear electrodes, 4) metallic implants and 5) silicon implants. In his lecture the author will demonstrate examples of 1 and 2 respectively. Coating of catheters with the above mentioned NPs were performed and the coated catheters were inserted in rabbits. Results showed that the urine of the rabbits was not contaminated with bacteria.

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