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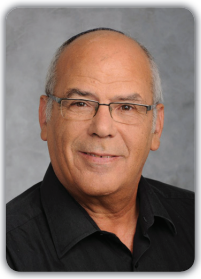

Aharon Gedanken

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

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, I'll 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 nano Ag, 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 75 0 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 PIGOROV Hospital in Sofia, Bulgaria in which one operation room was equipped with antibacterial textiles, namely, bed sheets, pajamas, pillow cover, and bed cover. 22 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 are demonstrating that a lower infection level is observed for those patients exposed to the antibacterial textiles. In addition, medical devices were also coated with the same NPs. 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) silicone implants. In my lecture examples of 1) and 2) will be demonstrated. 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.

Speaker Biography

Aharon Gedanken obtained his PhD degree from Tel Aviv University, Israel. After his postdoctoral research at USC in Los Angeles. He got a lecturer position at BIU on Oct 1975. In 1994, he switched his research interest from spectroscopy to nanotechnology. His special synthetic methods of nanomaterials include: Sonochemistry, Microwave Superheating, Sono-electrochemistry, and Reactions under Autogenic Pressure at Elevated Temperatures (RAPET). Since 2004, he is mostly focused on the applications of nanomaterials. He has published 825 peer-reviewed manuscripts in international journals. His H-Index is 90. He was a partner in five EC FP7 projects one of them, SONO, was coordinated by him. This project was announced by the EC as a "Success Story". He was the Israeli representative to the NMP (Nano, Materials, and Processes) committee of EC in FP7. He was awarded the prize of the Israel Vacuum Society in 2009 and the Israel Chemical Society for excellence in Research in Feb 2013.

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