

# Ultrasonic technology for production of antibacterial nanomaterials and their coating on textiles

Vladimir ABRAMOV<sup>1</sup>, Anna ABRAMOVA<sup>1</sup>, Aharon GEDANKEN<sup>2</sup>, Ilana PERELSHTEIN<sup>2</sup>, Vadim BAYAZITOV<sup>1</sup>, Anatolie SIDORENKO<sup>3</sup>

<sup>1</sup>Institute of general and inorganic chemistry of the Russian Academy of Sciences, Moscow, 119991, Russian Federation, (e-mail: anna\_v\_abramova@mail.ru)

<sup>2</sup>Bar Ilan University, Department of Chemistry, Ramat-Gan, 52900, Israel

<sup>3</sup>Institute of Electronic Engineering and Nanotechnologies ASM, Chisinau MD2028 Moldova

## Abstract

A method for production of antibacterial ZnO nanoparticles has been developed. The technique combines passing an electric current with simultaneous application of ultrasonic waves. Using high power ultrasound a cavitation zone is created between two zinc electrodes. This leads to the possibility to create a volumetric electrical discharge in water. Creation of such discharge leads to the depletion of the electrodes and the formation of ZnO nanoparticles, which demonstrate antibacterial properties. At the end of this reaction the suspension of ZnO nanoparticles is transported to a specially developed ultrasonic reactor, where the nanoparticles are deposited on the textile. The nanoparticles are embedded into the fibers by the cavitation jets (which are formed due to asymmetric bubble collapse in the presence of a solid surface) directed towards the surface of textile at very high velocities. Fabrics coated with ZnO nanoparticles using the developed method showed good antibacterial activity against *E. coli*.

Key words: cavitation, nanoparticle, ultrasound, antibacterial textile

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