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### Ion-synthesized porous silicon with silver nanoparticles

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Porous materials have attracted remarkable concerns and found tremendous importance widespread in both fundamental research and industrial applications. Such materials could be widely used for variety applications as absorbents, lightings, catalysts, and for biological molecular filtration and isolation. One quite known method for preparation of porous semiconductor structures is ion implantation, which was successfully used to create porous germanium layers by Ge<sup>+</sup>, Bi<sup>+</sup> and Sn<sup>+</sup> ion irradiation of crystalline germanium substrates. Ion implantation is a well established and an accessible technique all over the world, being mainly used for semiconductor microelectronic device fabrication. Unfortunately, a possibility about Porous Silicon (PSi) fabrication using ion implantation was not completely studied now. At modern time, PSi is considered as a key material in many industrial sectors such as electronics, sensors and photonics. In general, there were only two main technological methods for production of PSi structures – electrochemical etching and chemical stain etching. Additionally, the interest to PSi nanostructures containing noble metal nanoparticles was recently found. Silver nanoparticles are the subject of specific increasing interests due to their strongest plasmon resonance in the visible spectrum. In the present report, a novel technological approach based on low-energy ion implantation is suggested and realized to create PSi layers on the crystalline surface of Si wafers. It is demonstrated that using high-dose Ag-ion implantation of silicon with the energy of 30 keV, the surface PSi structures with silver nanoparticles can be successfully fabricated.

### Biography

A L Stepanov has been with Kazan Physical-Technical Institute, Russian Academy of Sciences since 1992. In 1997-1999, he was a Research Fellow at the Sussex University, UK (the Royal Society/NATO). From 1999 to 2003, he was a Research Fellow of the RWTH in Germany (the Alexander von Humboldt Foundation). During 2003-2004, he was granted by Lise Meitner Fellowship (Austrian Scientific Society) in Karl-Franzens-University in Graz. From 2004 to 2011, he was a Research Fellow in Laser Zentrum Hannover in Germany (DAAD, DFG and the AvH). In 2013, he was granted by the National Scholarship of the Slovak Republic.

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