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The universal technique for thin nanowire bottom-up design

There are three types of nano-objects, namely 0D-nanoparticles, 1D-nanowires and 2D-nanofilms. The methods of colloidal chemistry represent a universal tool for the nanoparticles production and the deposition of the precursors on the boundary between two different bulky phases allows growing any nanofilms. However there was no universal approach to nanowire (NW) production, because the universal 1D-template restricted the precursor growth in transversal direction is mandatory for thin wire bottom-up production. The solution was found in the mostly unexpected and exotic place, namely in the liquid superfluid helium (He II). The quasi-1D quantized vortices appeared by turbulence in He II display the affinity to any guest particles embedded to He II and their coagulation then occur only in the vortex cores. Introducing the different metals into He II by laser ablation of submersed metallic targets we create the real "NW-factory". The NWs have been already grown from more than 30 metals and alloys. Their diameters D ranged from 8 nm for fusible metals to 1.6 nm for refractory ones, and the NW structure and shape were quite perfect. The nanowires with thickness of few nanometers are of interest for many applications. The promises for their using in catalysis, for quantum devices inventions and for the formation of nano-heterostructures with unique properties will be outlined and discussed.

Biography

Eugene B Gordon has completed his PhD in 1970 from Moscow University for Physics and Technology (MUPT) and Doctor of Science degree in 1981 from Institute of Problems of Chemical Physics (IPCP), Russian Academy of Sciences. Now he is the Principal Scientist of IPCP and Professor of Chemical Physics in MUPT. He has published more than 160 papers in reputed journals and is the member of All-Russia Supreme Qualification Committee, the member of Dissertation Councils in the IPCP and in Joint Institute of High Temperatures

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