SSNN 32P **INFLUENCE THE ELASTIC DEFORMATION AND LOW MAGNETIC FIELD ON THERMOELECTRIC PROPERTIES SEMICONDUCTOR $Bi_{1-x}Sb_x$ NANOWIRES**

P.P. Bodiul[1,2*], I. A. Popov[1], E. F. Moloshnik[1], E. Istratii[1], A. Poltavets[1]
[1]*Ghitu Institute of Electronic Engineering and Nanotechnologies, ASM, Chisinau, Moldova;*
[2]*Technical University, Chisinau, Moldova*
*E-mail: pavelbodiul@mail.ru

We present the experimental results of the measurements the thermoelectric and magnetothermoelectric properties of semiconductor $Bi_{1-x}Sb_x$ nanowires, classified as topological insulators [1] at elastic deformation. The individual $Bi_{1-x}Sb_x$ wires in glass cover were prepared by high- frequency liquid phase casting (method Teilor- Ulitovsky). Cylindrical form the single – crystal nanowires by a diameter ranging from 75nm to 1mkm are characterized the (1011) orientation along the wire axis [2].

We found that with decreasing diameter of the nanowires, the temperature range of exponential growth of resistance shifts into a higher temperature region and the energy gap ΔE increase due the quantum confinement effect as ΔE~1/d. We also observed, that small- diameter wires at low temperatures show a sharp deviation from the behavior of the resistance R(T), characteristic of semiconductor. That can be interpreted in terms of the surface states in topological insulators $Bi_{1-x}Sb_x$ nanowires as well as registration of Shubnikov de Haas oscillations in thin semiconductor nanowires. It was show, that thermopower is negative in all temperature range and strongly dependent on diameter wires (Fig. 1). The influence magnetic field and elastic deformation on thermoelectric properties has been studied. It was shown that low magnetic field and elastic tension in $Bi_{1-x}Sb_x$ nanowires lead to an increase in absolute value of thermopower and decrease of resistance (Fig. 1, inset). That is turn leads to growth of the power factor $P.f.=\alpha^2\sigma$ (α- thermopower, σ- electrical conductivity) and thermoelectric figure of merit.

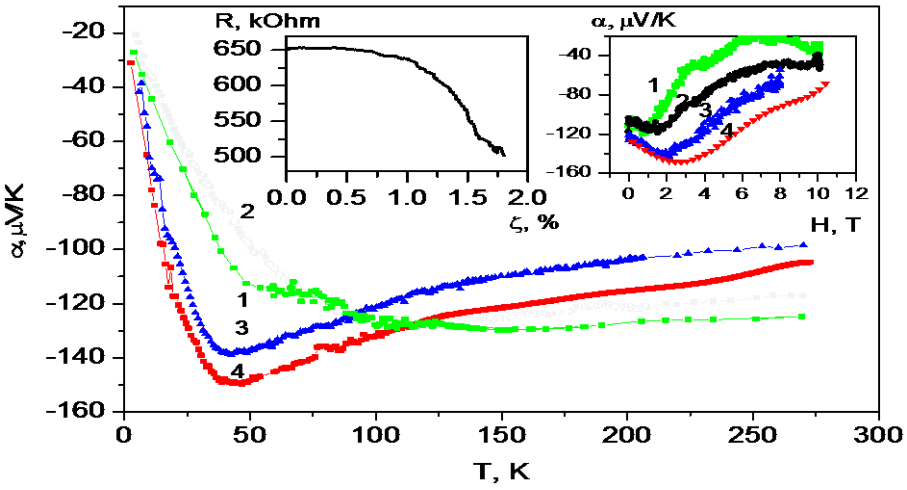

Fig. 1. Temperature dependences of thermopower for Bi-17at%Sb wires with different diameter: 1. d= 100 nm, 2. d= 200 nm, 3. d= 600 nm, 4. d= 900 nm. Inset on the right: the field dependences thermopower at different temperatures Bi-17at%Sb wire, d=100nm, 1. T= 7 K, 2. T= 52 K, 3. T= 100 K, 4. T= 143 K. Inset on the left: deformation dependence resistance R(ξ).

Our results indicate that magnetic field and elastic tension could be an effective method to enhance the thermoelectric figure of merit in thin wires topological insulators $Bi_{1-x}Sb_x$.

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