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## **Thermoelectric properties of $\text{Bi}_{1-x}\text{Sb}_x$ ( $0 \leq x \leq 0.12$ ) wires depending on diameter, composition and temperature**

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### **Abstract**

Behaviour of kinetic coefficients versus temperature (4.2 - 300 K), composition and diameter ( $d$ ) was studied on the samples of thin single-crystal bismuth and  $\text{Bi}_{1-x}\text{Sb}_x$  wires obtained by the Ulitovsky method. Antimony content ( $x$ ) in the samples varied from 0 to 12 at.%, diameter - from 0.3 to 3  $\mu\text{m}$ . The resulting dependences indicate that maximum thermoelectric figure of merit corresponds to composition  $\text{Bi}_{0.88}\text{Sb}_{0.12}$ . Maximum values of power factor ( $\alpha^2\sigma$ ) are observed at the values of  $d \geq 2 \mu\text{m}$  in the temperature range of 80 - 200 K. Temperature range of maximum power factor value essentially depends on the wire diameter  $d$ : diameter reduction results in displacement of maximum value ( $\alpha^2\sigma$ ) to higher-temperature region which is important for practical applications.

*Keywords: single-crystal bismuth wires, thermoelectric figure*