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Anisotropic Thermoelectric Generator Made from Single Crystal Bi Microwire

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Currently, for thermoelectric conversion of heat most widely used is the approach based on the Seebeck and Peltier effects created at the interface of two materials with different values S of the Seebeck coefficient. Another type of thermoelectric converter is the anisotropic thermoelement (AT) using anisotropy of thermoelectric power. AT has some advantages: - the transverse thermopower, unlike a conventional thermocouple, is proportional to the temperature gradient $(T_1-T_2)/h$ instead of the temperature difference T_1-T_2; - Voltage V is proportional to the length l of AT. To increase the AT output voltage we need either increase the length l of AT or decrease its thickness h. According to our experimental data, to obtain a thermoelectric voltage of 1 V at a transverse temperature gradient of 5 K, the microwire with a diameter of 2 μm and a length of 8 m must be used. In our experimental sample the long wire in glass coating was wound into a flat spiral.