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A setup for simultaneously measureing the thermopower and electrical conductivity of μm-thickness specimens CHIH-TING CHEN, Institute of Physics, Academia Sinica, P.C. LEE, Y.Y. CHEN, SERGEY HARUTYUNGYAN, INSTITUTE OF PHYSICS, ACADEMIA SINICA TEAM — We report the concept and configuration of our new setup for measurement of thermopower and electrical conductivity for μm-thickness specimens, especially for thermoelectric materials. It is very difficult and tedious to accurately measure the thermopower for specimens with thickness less than $\sim$100 μm due to the limitations of smallest size $\sim$25μm of thermocouples. Such are obvious when applied to the measurement of nanowire arrays and multilayer . In order to resolve these difficulties, we developed a new setup with integration of Pt-film thermometers and electrical electrodes on two sapphire chips used to clamp specimens with thickness >40 μm and cross section 2 x 3 mm^2. Use this setup the thermopower and electric conductivity can be measured simultaneously for temperature range 20-400 K. The advantages of the setup are (1) accuracy: the real temperatures of both sides of the sample can be obtained. (2) convenience for loading samples: just assemble the sample between the two microchips and make sure of a good thermal and electrical contacts. A Bi_2Te_3 nanowire array in AAO template was tested, the thermopower $\sim$ 50μV/K was measured for diameter $\sim$ 60 nm of nanowires.

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