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Diameter Dependence of the Transport Properties of Antimony Telluride Nanowires YURI ZUEV, Applied Physics Department, Columbia University, JIN SOOK LEE, Chemistry Department, Sookmyung Women's University, HONGKUN PARK, Physics and Chemistry Department, Harvard University, PHILIP KIM, Physics and Applied Physics Department, Columbia University — We report measurements of electronic, thermoelectric, and galvanometric properties of individual semimetallic single crystal antimony telluride (Sb2Te3) nanowires. Microfabricated heater and thermometer electrodes were used to probe the transport properties of the nanowires with diameters in the range of 22 - 95nm and temperatures in the range of 2 - 300K. Temperature dependent resistivity varies depending on nanowire diameter. Thermoelectric power (TEP) measurements indicate hole dominant diffusive thermoelectric generation, with an enhancement of the TEP for smaller diameter wires. The large surface-to-volume ratio of Sb2Te3 nanowires makes them an excellent platform to explore novel phenomena in this predicted topological insulator. We investigate mesoscopic magnetoresistance effects in magnetic fields both parallel and perpendicular to the nanowire axis.

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