

Abstract Submitted
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Four-probe measurements of individual metallic and superconducting nanowires SHENG-YONG XU¹, DMP, MINGLIANG TIAN, DMP, NITESH KUMAR, DMP, MOSES H. W. CHAN, DMP, CHAN GROUP TEAM — We have performed 4-probe measurements for a number of individual Au, Ag, Sn and Zn nanowires. The resistivity of these nanowires is always larger than their bulk values, and varies with the crystallinity of the nanowires. Single crystalline Sn nanowires have a resistivity similar to that of bulk Sn, while polycrystalline Au nanowires shows a resistivity twenty to thirty times higher than that of bulk Au. For Sn nanowires with diameter from 280 nm to 70 nm, the superconducting transition temperature T_c remains the same as, or slightly lower than the T_c of bulk Sn, 3.7 K. The critical current density of these Sn nanowires is measured to be in the order of 105 A/cm² at low temperature. The critical fields of the nanowires, as expected, are much higher than that of Sn films. A finite resistance, which increases with increasing excitation current, is observed in all the samples. The origins of this finite resistance will be discussed. We have also obtained evidence that the four metallic leads assembled on each single nanowire may have remarkable effects on the transport properties of the nanowire.

¹presenting author

Sheng-Yong Xu
DMP

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