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Electrical transport studies of Topological Insulator Bi_2Te_3 Nanotubes RENZHONG DU, WEIWEI ZHAO, Department of Physics, Penn State Univ., JIAN WANG, ICQM, PKU, YUEWEI YIN, SINING DONG, XIAOGUANG LI, Department of Physics, USTC, CHAOXING LIU, MOSES CHAN, QI LI, Department of Physics, Penn State Univ. — We have studied electrical transport properties of candidate topological insulator Bismuth Telluride (Bi_2Te_3) nanotubes. Bi_2Te_3 nanotube samples were synthesized by solution phase method, with the outer diameters in the range of 70±5 nm and inner diameter 50±5 nm and the length of 3 to 10 um. Platinum contact leads were fabricated on the nanotubes by focusing ion beam assisted deposition. Electrical transport measurements were conducted at low temperatures and high magnetic fields (up to 9T). The nanotubes showed good insulating behavior in comparison with the thin films which are often metallic. Resistance oscillation as a function of magnetic field was observed when the magnetic field is applied parallel to the nanotubes. The periods range from 6000 Oe to 8350 Oe, which correspond to the diameter of 80 to 100 nm according to Aharonov-Bohm oscillation formula. This is close but slightly larger than the outer diameter of the nanotubes. The amplitude of the oscillations decays rapidly as field increases, possibly due to scattering. When the magnetic field was applied perpendicular to the nanotube, no resistance oscillation was observed. The possible origins of the oscillation effect will be discussed.

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