Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Investigation of the transport properties of Bi2Se3 films grown on various substrates H.Y. LIN, C.Y. WANG, K.H.M. CHEN, Dept. of Physics, National Tsing Hua Univ., Hsinchu 30013, Taiwan, Y.H. LIN, K.H. CHEN, B.Y. YANG, Dept. of Physics, National Taiwan University, Taipei 10617, Taiwan, M. HONG, Graduate Institute of Applied Physics, National Taiwan University, Taipei 10617, Taiwan, J. KWO, Dept. of Physics, National Tsing Hua Univ., Hsinchu 30013, Taiwan — Topological insulators, a new state of quantum matter, displayed a variety of physical phenomena. We have obtained high quality TI films of Bi_2Se_3, Bi_2Te_3, and Sb_2Te_3 grown on various substrates with streaky RHEED patterns and large domains 1-2um in size. However, the Fermi level of Bi_2Se_3 tends to locate in the bulk conduction band due to the high density of intrinsic defects in TIs. To fine tune the Fermi level to be within the band gap, Bi_2Se_3 films were grown on amorphous oxide layers such as SiO_2, Y_2O_3, and Al_2O_3 $\sim$20 nm thick deposited on GaAs and Si substrates in a back gate structure for the electrical field effect. Compare to Bi_2Se_3 thin films on crystalline substrates such as sapphire, samples grown on amorphous oxides such as Al_2O_3 showed lower carrier concentration for the film thickness less than 10 QL, and the resistivity showed an insulating behavior at T below 50K. Other transport properties such as mobility, WAL effects are underway.

M Hong
Graduate Institute of Applied Physics,
National Taiwan University, Taipei 10617, Taiwan

Date submitted: 14 Nov 2014 Electronic form version 1.4