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Structural and Magnetotransport Studies of MBE-grown Pn(Sn)Te films and PbTe:Bi/CdTe Quantum Wells XIANG LI, XINYU LIU, JACEK FURDYNA, MALGORZATA DOBROWOLSKA, University of Notre Dame, TOMASZ WOJTOWICZ, Institute of Physics, Polish Academy of Sciences — Recent studies confirmed the existence of topological crystalline insulators (TCIs), in which crystalline symmetry replaces the role of time-reversal symmetry in ensuring topological protection. In the narrow-gap semiconductor TCIs, chemical potential can be tuned by modifications of crystal growth and/or annealing to yield n-type or p-type conductivity, which makes them especially well-suited for magnetotransport measurements. In this work, we have grown a series of $Pb_{1-x}Sn_xTe$ films and PbTe:Bi/CdTe QWs on CdTe/GaAs(100) substrates using MBE. Structural studies of these thin films were carried out using XRD and SEM techniques. XRD results shows satisfactory crystal quality of Pb(Sn)Te films grown on CdTe. SEM studies show the presence of inclusions in the films, indicating that the crystal quality still requires improvement. Magnetostransport studies of PbTe:Bi/CdTe QWs suggests that Bi acts as a donor in PbTe, and the electron mobility in the 2D electron gas in the QW depends on the growth conditions, such as substrate temperature. The study of $Pb_{1-x}Sn_xTe$ QWs is currently underway, and will also be discussed in this talk.

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