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Synthesis and low-temperature transport measurement of pure and In-doped SnTe nanoplate JIE SHEN, YUJUN XIE, JUDY J. CHA, Yale Univ — SnTe is a topological crystalline insulator that possesses different surface states on the {100}, {110}, and {111}surfaces. Thus, to access surface states selectively, it is critical to control the morphology of SnTe. Moreover, indium doping in SnTe induces superconductivity, making it a candidate for a topological superconductor. Here, we grow pure and In-doped SnTe nanoplates, whose top and bottom surfaces are either (100) or (111), via vapor-liquid-solid and vapor-solid growth mechanisms. For pure SnTe nanoplate, we observe a structural phase transition from rock salt to rhombohedral structure in samples with low carrier density and electron-electron interactions in samples with high carrier density. In addition,by studying nanoplates with indium-doping concentrations ranging from 0% to 10%, we show that nanoplates become more diffusive in bulk and such that the surface states appear at higher concentrations of indium. This is supported by a three-dimensional weak antilocalization in low magnetic fields and a two-dimensional(2D) linear magnetoresistance(LMR) in high magnetic fields. This 2D LMR comes from the Dirac-dispersive surface state, in agreement with Abrikosov's quantum limit model.

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