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Structural and Electronic Properties in multilayer $(BiSe)_n(TiSe_2)_m$ Misfit compounds BENJAMIN TRUMP, MAXIME SIEGLER, KEN LIVI, TYREL MCQUEEN, Johns Hopkins University — The nature of the charge density wave (CDW) transition in 1T-$TiSe_2$ has been hotly debated, and variously described as a simple CDW to the formation of an excitonic insulator. Here we report the synthesis and basic physical properties of the incommensurate layered chalcogenides $(BiSe)_n(TiSe_2)_m$. Their structure consists of a rock-salt type BiSe layer separated by one or more edge-sharing $TiSe_2$ octahedral layer. These octahedral layers are isomorphic to the layers found in 1T-$TiSe_2$, and thus provide a mechanism to study the electronically driven structural transition in $TiSe_2$ as a function of the number of layers. Structural determinations from electron and x-ray diffraction, using 4/5-D superspace approach, will be presented, and the implications of our results on the understanding of CDW formation in $TiSe_2$ will be discussed. The effects of doping with Cu to observe possible superconducting behavior is also explored.

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