Electronic and magnetic properties of $MnSnAs_2$

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We have also synthesized $MnSnAs_2$ single crystals using the vertical temperature gradient solidification method. The crystal structure of $MnSnAs_2$ is chalcopyrites, which are "genealogically" related to the more familiar tetrahedrally-coordinated zinc-blende materials, with lattice constants of a=5.794 Å/ c=11.365 Å. Using the experimentally determined lattice constants and crystal structure, we carried out first principles electronic structure calculations, using the full-potential linearized augmented plane wave (FLAPW) method in the local density approximation (LDA). The lowest total energies were observed for the AFM state, indicating that AFM ordering in the system is energetically favored at 0 K. We find that $MnSnAs_2$ is *metallic* in the electronic calculation. Interestingly, $MnSnAs_2$ exhibited ferromagnetism with T_C = 328 K and a magnetic moment per Mn at 5K of 2 μ_B. In this presentation we will discuss electronic, electrical, and magnetic properties of newly synthesized chalcopyrite $MnSnAs_2$ compound.