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Magnetic properties of narrow gap $\text{In}_{1-x}\text{Mn}_x\text{Sb}$ semiconductor films with $x > 0.10$ CAITLIN FEESER, JOHN PETERS, BRUCE WESSELS, Northwestern University — Narrow gap $\text{In}_{1-x}\text{Mn}_x\text{Sb}$ magnetic semiconductors with $x < 0.05$ have been recently shown to have interesting magnetotransport properties at room temperature.¹ Calculations based on the field dependence of the magnetoresistance indicate that the carriers are highly spin polarized. To increase both the saturation magnetization and potentially the Curie temperature T_c of the alloys, we have investigated MOVPE epitaxial layers with $0.10 < x < 0.22$. Films were ferromagnetic at room temperature, showing clear hysteresis in field dependent measurements from 5 to 300 K. Alloys with magnetization values as high as 83 emu/cm^3 for $x=0.22$ were measured at 5 K. Temperature dependent magnetization indicated that the Curie temperature of the films was above 400 K. These measurements indicated the presence of two magnetic species both with Curie temperatures above 300 K. The high T_c is attributed to carrier mediated ferromagnetism involving Mn and its complexes that form shallow or resonant electronic states with the valence band through correlated substitution.

¹J. A. Peters et al, PRB **82** 2010.

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