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Magnetotransport studies of $Ga_{1-x}Mn_xSb$ Random Alloys. M. EGINLIGIL, G.B. KIM, S. WANG, H. LUO, B.D. MCCOMBE, Department of Physics, University at Buffalo, SUNY — We report magnetotransport and magnetization measurements from two sets of well-characterized $Ga_{1-x}Mn_xSb$ samples grown by molecular beam epitaxy: set 1 - varying Sb/Ga flux ratios and constant nominal Mn concentration of 2.3%; set 2 - constant flux ratio (Sb/Ga=5.7) and varying nominal Mn content. Plots of R_{sheet}vs. temperature show both metallic and thermally activated behavior. Two samples (one from each set) having the highest effective Mn content (as determined from measurements of saturation magnetization at low temperatures) but different flux ratios, exhibited thermally activated transport. Hole densities in the range 2.6x10^{19}cm^{-3} to 1.3x10^{20}cm^{-3} were extracted from plots of R_{Hall}/ R^{α}_{Sheet} vs. B/ R^{α}_{Sheet} at high fields and low temperatures; for the metallic samples $1 < \alpha$ <2 and for the samples showing thermally activated behavior α < 1. The two samples that showed thermally activated transport, although they had the highest measured Mn content, have hole densities at the low end of the measured range. Both of these samples also exhibit extrema in the remnant hall resistance vs. temperature, with the sample from set 1 also showing very complex behavior of the anomalous Hall coefficient (a change of sign) vs temperature. This complex behavior is attributed to movement of the chemical potential through a region of non-monotonic behavior of the density of states vs. energy. Supported in part by DARPA ONR SpinS and NSF ECS0224206.

Mustafa Eginligil
Department of Physics, University at Buffalo, SUNY

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