Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Recent Neutron and Transport Measurements on $Yb_{14}MnSb_{11}$ and $La_2Yb_{12}MnSb_{11}$ Single Crystals T. ENCK, S.E. NAGLER, D.G. MANDRUS, B.C. SALES, M.M. YETHIRAJ, H.A. MOOK, P. KHALIFAH, E. NAGLER, ORNL — $Yb_{14}MnSb_{11}$ and $Yb_{13.3}La_{0.7}MnSb_{11}$are ferromagnetic Zintl compounds where the magnetic Mn atoms are well-defined crystallographic sites about 10Å apart. Since only about 4% of the atoms are magnetic (only the Mn atoms are magnetic), these materials represent ideal dilute magnetic semiconductors because there is no possibility of forming clusters of magnetic impurity phases. The measured carrier concentration of about 1 x 10^{21} holes/cm^3 in several $Yb_{14}MnSb_{11}$ crystals (T_c=53K) is characteristic of a heavily doped semiconductor. La doped crystals (T_c=39K) were grown in an attempt to lower the carrier concentration and to study the change in the magnetic coupling between the Mn atoms via the holes. In this structure, each Mn atom is tetrahedrally coordinated by 4 Sb atoms. Preliminary unpolarized neutron diffraction experiments showed no clear evidence of a magnetic moment on the Sb in contrast to the previously reported results. Recent magnetization and Hall data on these crystals will be presented along with existing neutron diffraction data.

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Date submitted: 23 Nov 2004 Electronic form version 1.4