

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Magneto-optical and magnetic studies of Co and Cr doped CdMnTe S. SHEN, X. LIU, Y.J. CHO, J. FURDYNA, M. DOBROWOLSKA, University of Notre Dame, Y.H. HWANG, Y.H. UM, University of Ulsan — We investigate the magneto-optical and magnetic properties of two new CdMnTe-based diluted magnetic semiconductors. The first system consists of a series of $\text{Cd}_{1-x-y}\text{Mn}_x\text{Cr}_y\text{Te}$ alloys with Mn concentration x fixed at ~ 0.37 and controlled Cr concentration y in the range $0 < y < 0.07$. The second system is the quaternary $\text{Cd}_{1-x-y}\text{Mn}_x\text{Co}_y\text{Te}$ alloy, with the same Mn concentration ($x = 0.37$) and the Co concentration y in the range $0 < y < 0.009$. These systems are of interest in that they are expected to involve interactions of the minority magnetic ions (Cr and Co, respectively) with the surrounding majority Mn ions. Indeed, optical absorption and MCD spectra observed on these alloys reveal a series of new “impurity” peaks that are not present in the $\text{Cd}_{0.63}\text{Mn}_{0.37}\text{Te}$ control samples. It is interesting that the magnetic field dependence of the MCD spectra as well as SQUID measurements reveal a ferromagnetic-like hysteresis loop in $\text{Cd}_{1-x-y}\text{Mn}_x\text{Cr}_y\text{Te}$ samples with Cr concentration y in the range of $0 < y < 0.03$. Surprisingly, the FM loop survives up to 295 K. But this ferromagnetic behavior is not observed in samples with $y > 0.05$. One should note that FM loops were not observed in $\text{Cd}_{1-x-y}\text{Mn}_x\text{Co}_y\text{Te}$ samples.

Shaoping Shen
University of Notre Dame

Date submitted: 07 Dec 2008

Electronic form version 1.4