Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Study of the anomalous Hall effect, magnetoresistance, and magnetic anisotropy in ZnO:Co and ZnO:Mn thin films Z. YANG, Z. ZUO, Y. PU, M. BIASINI, W. BEYERMANN, J. SHI, J. LIU, QUANTUM STRUCTURES LABORATORY, DEPT OF ELECTR ENGR, UNIV OF CALIFORNIA, RIVERSIDE, CA TEAM, DEPT OF PHYSICS AND ASTRONOMY, UNIV OF CALIFORNIA, RIVERSIDE, CA TEAM — ZnO-based diluted magnetic semiconductor (DMS) materials have attracted much attention in these years due to the theoretical prediction of above room-temperature ferromagnetism. So far, most of the experiments were focused to the study of the magnetization of the ZnO DMS materials. However, the magnetization study, by only providing a global information on the moment of the material, cannot distinguish the intrinsic magnetic properties from the extrinsic contributions. The ZnO thin films were grown on sapphire substrates by molecular-beam epitaxy. The Co- and Mn-implantations were performed on the as-grown ZnO samples with different free carrier concentrations. Anomalous Hall effect (AHE) and magnetoresistance measurements were performed on the ZnO:Co and ZnO:Mn thin films. AHE hysteresis loops were observed in both ZnO:Co and ZnO:Mn thin films, which confirm the intrinsic ferromagnetism in both films. However, the AHE hysteresis loops are distinctly weaker than the magnetization hysteresis loops ($M - H$) measured by SQUID. Therefore we conclude that both intrinsic and extrinsic ferromagnetism co-exist in the samples.

Z. Yang

Date submitted: 14 Dec 2007 Electronic form version 1.4