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Effect of carrier concentration on Magnetic Circular Dichroism (MCD) in GaMnAs/ZnSe hybrid structures with Be and Si co-doping R. CHAKARVORTY, K. J. YEE, X. LIU, P. REDLINSKI, M. KUTROWSKI, L.V. TITOVA, T. WOJTOWICZ, J.K. FURDYNA, B. JANKO, M. DOBROWOLSKA, University of Notre Dame — We have investigated MCD in a series of magnetic epitaxial $Ga_{0.99}Mn_{0.01}As$ layers grown on hybrid ZnSe/GaAs substrates, with various levels of Be and Si co-doping. The carrier concentration, which plays a key role in ferromagnetism of GaMnAs, was controlled by the temperature of Be and Si cell during the growth. Optical absorption and MCD measurements were carried out as a function of temperature and wavelength in magnetic fields up to 6.0T using circularly polarized light combined with photo-elastic modulation. The magnitude and the spectral form of the MCD showed a clear progressive change as the hole concentration increased. The observed magnetic field and temperature dependence of the MCD data cannot be explained by the k.p model proposed by Szczytko et al. (PRB 64, 75306 (2001)). A likely reason for the failure of the latter model is that – due to the very large number of impurities in the samples – one must additionally include band renormalization in the calculations. Such renormalization would result in different band shapes of the two spin sub-bands, and consequently in different spectral shapes of the absorption coefficients for the σ^+ and σ^- polarizations. *M. Kutrowski and T. Wojtowicz are also in Institute of Physics, Polish Academy of Sciences, Warsaw, Poland.

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