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Micro-spectroscopy of $Ga_{1-x}Mn_xAs$ and $Ga_{1-x}Be_xAs$ films with gradient doping and compensation BRIAN CHAPLER, University of California San Diego, R.C. MYERS, D.D. AWSCHALOM, University of Californai Santa Barbara, M.C. MARTIN, Lawrence Berkeley National Laboratory, K.S. BURCH, Los Alamos National Laboratory, D.N. BASOV, University of California San Diego — A detailed study into the problem of carrier induced magnetism in ferromagnetic III-Mn-V semiconductors is being carried out using micro-infrared measurement techniques. Infrared micro-spectroscopy and broad-band micro-ellipsometry measurements have been performed on films of $Ga_{1-x}Mn_xAs$, x = 0.03, 0.16, as well as $Ga_{1-x}Be_xAs$, x = 0.018. The films were prepared using non-rotated molecular beam epitaxial growth. The results of this growth are films with a varying As:Ga ratio across the sample. Using the above experimental techniques, measurements can be taken at specific locations along the As:Ga gradient, which have shown to cause systematic changes in spectra as a function of As:Ga ratio. These experiments provide a unique opportunity to study the effects of disorder, compensation, and doping in these samples. In addition, comparing Mn doped and Be doped films allows for distinguishing the effects of doping with magnetic versus non-magnetic impurities.

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