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Material preparation and infrared spectroscopy of diffusion doped Cr: ZnSe and Cr: CdTe IVY KRYSTAL JONES, UWE HOMMERICH, EI EI NYEIN, Hampton University, Department of Physics, S. B. TRIVEDI COLLABORATION[1] — The preparation and infrared spectroscopy of diffusion doped Cr:ZnSe and Cr:CdTe windows will be reported. Cr^{2+} doped II-VI semiconductors are of significant current interest as gain media in mid-infrared (2-3 μm) solid-state lasers. Compared to Cr:ZnSe, Cr:CdTe exhibits an extended infrared emission, which is of interest for laser applications beyond 3μm. Cr doping in ZnSe and CdTe was achieved through a thermal diffusion process controlled by temperature and time. Commercial CrSe powder was used as the dopant source in the diffusion experiments. Various samples of Cr:ZnSe and Cr:CdTe were prepared with Cr^{2+} peak absorption coefficients ranging from $\sim$0.8 cm^{-1} to 28.7 cm^{-1}. The corresponding Cr^{2+} concentrations ranged from $\sim$1x$10^{17}$$cm^{-3}$ to $\sim$3x$10^{19}$$cm^{-3}$ assuming absorption-cross sections of 1.1x$10^{-18}$$cm^2$ for Cr:ZnSe and 2.2x$10^{-18}$$cm^2$ for Cr:CdTe. For low Cr^{2+} concentrations ($\sim$1x$10^{18}$$cm^{-3}$) the room-temperature decay time varied between 5-6 μs for Cr:ZnSe and 2-3μs for Cr:CdTe. The effect of Cr concentration quenching on the mid-infrared emission was observed for doping concentrations above $\sim$1x$10^{19}$$cm^3$.

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