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Optical properties of epitaxial $ZnGeAs_2$ thin film S.G. CHOI, NREL, D.E. ASPNES, NCSU, M. VAN SCHILFGAARDE, ASU, T.J. PESHEK, T.J. COUTTS, A.G. NORMAN, J.M. OLSON, D.H. LEVI, NREL — Chalcopyrite $ZnGeAs_2$ lattice-matched to GaAs(001) is a promising 1.1 eV band gap semiconductor for applications in nonlinear photonic devices and multijunction solar cells. Knowledge of the optical functions of a material over a wide photon energy range is of importance to optimize photonic and photovoltaic device structures. We present room-temperature optical properties of a $ZnGeAs_2$ thin film grown epitaxially on a GaAs(001) substrate by metalorganic vapor phase epitaxy. Spectroscopic ellipsometry was employed to measure the pseudodielectric function of the $ZnGeAs_2$ thin film, and was compared with a theoretical calculation within the quasiparticle self-consistent GW approximation. The interband-transition critical-point energies were obtained from a standard lineshape analysis of the measured spectrum. We will also present a comparison of the optical properties of $ZnGeAs_2$ with those of other II-IV-V_2 chalcopyrite compounds as well as their corresponding III-V zincblende compounds. This abstract is subject to government rights.

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