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Investigation of Room Temperature spontaneous emission in GeSn Alloys ZAIRUI LI, ZHAO YUN, Electro-Optics Program, University of Dayton, Dayton, OH 45469 , GALLAGHER JAMES, Department of Physics, Arizona State University, Tempe, AZ , AGHA IMAD, Department of Physics and Electro-Optics Program University of Dayton, Dayton, OH 45469, MENNDEZ JOS, Department of Physics, Arizona State University, Tempe, AZ, KOUVETAKIS JOHN, Department of Chemistry and Biochemistry, Arizona State University, Tempe, AZ, MATHEWS JAY, Department of Physics and Electro-Optics Program University of Dayton, Dayton, OH 45469 — An integrated Si-based laser, as a major element of on chip optical system, is ideal for large-scale integration between electronic and photonic devices. Recent development of Ge and GeSn epitaxial growth on Si creates the possibility of engineering such devices. In this work, we study the emission of infrared radiation from waveguides fabricated from GeSn alloys grown on Si. Experimentally, by using standard UV photolithography and dry-etched in a Cl plasma, our waveguides are fabricated from GeSn films grown epitaxially on Si(100)substrates. A 976nm wavelength solid-state laser optical-pump was applied onto the double-side polished waveguide at room temperature and the corresponding dependence of emission power was measured as a function of pump power. The results show strong nonlinear increasing dependence, indicating optical gain. Using a Fabry-Perot cavity, we found that the emission is incoherent. Additionally, we modeled the waveguide emission and compared it to the experimental data. The results show that the gain we observed is due to amplified spontaneous emission.

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