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**Raman and Fluorescence Study of Erbium-Doped Laser-Induced Crystals-in-Glass** BRIAN KNORR, Fairleigh Dickinson Univ, KEITH VEENHUIZEN, ADAM STONE, Lehigh University, HIMANSHU JAIN, Fairleigh Dickinson Univ, VOLKMAR DIEROLF, Lehigh University — Laser induced crystallization of glasses is a spatially selective process which has the potential to produce photonic integrated circuits in a glass matrix. Low temperature Combined Excitation Emission Spectroscopy in Er:$LaBGeO_5$ show that erbium incorporates at predominantly one majority site in both glass-ceramics and laser-induced crystals-in-glass, but that other minority sites also exist. The energy levels of the majority site were quantified. The fluorescence characteristics of the erbium ions in any site in the laser-induced crystals were found to be only weakly influenced by the irradiation conditions during growth. On the other hand, a hidden parameter, potentially boron deficiency-related defects, resulted in a significant change in the incorporation behavior of the erbium ions. Simultaneous scanning confocal Raman and fluorescence spectroscopy showed that the energies of the Raman modes are shifted, and the erbium fluorescence intensity varies, in a non-uniform manner, despite the host glass being homogeneously doped, across the cross-sections of laser-induced crystals in glass. These fluctuations within the Raman and fluorescence are spatially correlated, implying that different erbium sites form preferentially at different locations in the crystal cross-section.

Brian Knorr
Fairleigh Dickinson Univ

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