Infrared Emission and Upconversion Studies of Er$^{3+}$ Doped in the Low Phonon-Energy Hosts KPb$_2$Cl$_5$ and KPb$_2$Br$_5$ $^1$ ALTHEA BLUIETT, Elizabeth City State University, EI EI BROWN, CRAIG HANLEY, UWE HOMMERICH, Hampton University, SUDHIR TRIVEDI, Brimrose Corporation of America — There continues to be interests in Er$^{3+}$ doped materials that can generate efficient emission in the 1.5-1.6 um range for eye-safe laser applications and optical communications. Directly pumping the $^4I_{13/2}$ band of Er$^{3+}$ has been extensively studied in many hosts, such as YAG, however, it is well understood that the excitation of Er$^{3+}$ through this channel automatically generates unwanted upconversion emission, which depletes $^4I_{13/2}$ level of Er$^{3+}$ and moreover produces unwanted heating of the crystal. In this study, cw and pulsed laser excitation of the $^4I_{13/2}$ band of Er$^{3+}$ will be explored as a function of host material (KPb$_2$Cl$_5$ and KPb$_2$Br$_5$) rare-earth ion concentration, and temperature in the search for the optimum combination of variables to minimize upconversion and concurrently generate more efficient 1.5 $\mu$m emission from Er$^{3+}$.

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