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Near infrared emission properties of Nd doped Potassium Lead Halides JESSICA FREEMAN, EI NYEIN, UWE HOMMERICH, Hampton University, SUDHIR TRIVEDI, Brimrose Corporation of America, JOHN ZAVADA, US Army Research Office — The incorporation of rare earth (RE) ions into host materials with low maximum phonon energies provides opportunities for improved RE infrared emission properties. In this work, we evaluated the IR emission from Nd doped potassium lead halides, namely Nd: KPb₂Cl₅ and Nd: KPb₂Br₅, for possible applications in IR lasers and optical communications. Both halides are nearly non-hygroscopic and have low maximum phonon energies, which reduces non-radiative decay rates through multi-phonon relaxations. Following optical excitation at 800nm, near IR emission bands were observed from the ⁴F_{5/2} and ⁴F_{3/2} excited states of Nd³⁺. The ⁴F_{5/2} level was strongly quenched through non-radiative processes in Nd: KPb₂Cl₅. On the contrary, for Nd: KPb₂Br₅ the ⁴F_{5/2} was highly radiative with an emission efficiency of ~50%. More detailed results of the material synthesis, purification, steady-state and time-resolved emission spectroscopy will be presented at the conference.

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