Abstract Submitted
for the SES06 Meeting of
The American Physical Society

Mid-Infrared Emission from Sensitized Pr^{3+} in the Low Phonon-Energy Host KPb_2Cl_5 ALTHEA BLUIETT, Elizabeth City State University, EI BROWN, UWE HOMMERICH, Hampton University, SUDHIR TRIVEDI, Brimrose Corporation of America — Energy transfer from Yb^{3+} to Pr^{3+} was explored in the low-phonon energy host $KPb_2Cl_5$for 4-5 μm solid-state laser development. The incorporation of two rare-earth (RE) ions in a low-phonon energy host is expected to increase critical laser parameters such as pump efficiency and emission intensity through energy transfer. Moreover, incorporating the RE ions in a low phonon-energy host is expected to reduce the detrimental effects of non-radiative decay through multi-phonon emission. Evidence of efficient energy transfer was observed in Yb^{3+} $\rightarrow Pr^{3+}$ under 980 nm laser excitation This was accomplished by exciting the $^3H_4 \rightarrow {}^1G_4$ absorption transition of Pr^{3+} at 980 nm in singly doped Pr: KPb_2Cl_5 and the $^2F_{7/2} \rightarrow {}^2F_{9/2}$ absorption transition of Yb^{3+} at the same excitation wavelength in the Pr, Yb: KPb_2Cl_5 sample. The integrated emission intensity of Pr^{3+} in the co-doped sample is nearly 11 times larger relative to Pr^{3+} in the singly doped sample. This suggests that energy transfer between Yb and Pr was successful.

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Date submitted: 17 Oct 2006 Electronic form version 1.4