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Mid-infrared Emission and Energy Transfer Properties of Sensitized Rare Earth Ions in KPb_2Cl_5 ALTHEA BLUIETT, ERICA PINKNEY, Elizabeth City State University, EI BROWN, UWE HOMMERICH, Hampton University, SUDHIR TRIVEDI, Brimrose Corporation of America, JOHN ZAVADA, US Army Research Office — Mid-infrared emission (4-5 μm) originating from the first excited state of Pr^{3+} and from the first excited state of Nd^{3+} were generated by means of Yb^{3+} and Tm^{3+} sensitization, respectively. The mechanisms involved in sensitizing Pr^{3+} and Nd^{3+}ions were determined by studying the decay kinetics of the $^2F_{5/2} \rightarrow ^2F_{7/2}$ transition of Yb^{3+} and the $^3F_4 \rightarrow ^3H_6$ transition of Tm^{3+} under 970 nm and 1750 nm laser excitation, respectively. It was observed that the emission lifetime of the $^2F_{5/2} \rightarrow ^2F_{7/2}$ transition and the $^3F_4 \rightarrow ^3H_6$ transition were reduced considerably in the presence of the activator ions Pr^{3+} and Nd^{3+}, respectively. Strong 4-5 μm emission from Pr^{3+} and Nd^{3+}were observed in Yb, Pr:$KPb_2Cl_5$and Tm, Nd:KPb_2Cl_5, respectively. These findings indicate that significant energy transfer was transpired. Concentration dependent studies will be conducted to ascertain the dopant concentrations for efficient MIR emission.

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