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Absorption Intensities Analysis of Ho^{3+}:KPb_2Cl_5 SREERENJINI CHANDRASEKHARAN, KELLY L. NASH, JOHN B. GRUBER, DHIRAJ K. SARDAR, University of Texas at San Antonio — Optical absorption and emission intensities were investigated for Ho^{3+} in single crystal Ho^{3+}:KPb_2Cl_5. Room temperature absorption intensities of $Ho^{3+}(4f^{10})$ transitions in Ho^{3+}:KPb_2Cl_5 have been analyzed using the Judd-Ofelt (J-O) approach in order to obtain the phenomenological intensity parameters. The J-O intensity parameters are then used to calculate the spontaneous emission probabilities, radiative lifetimes, and branching ratios of the Ho^{3+} transitions from the upper multiplet manifolds to the corresponding lower-lying multiplet manifolds $^{2S+1}L_J$of $Ho^{3+}(4f^{10})$. Presently we are measuring the room temperature fluorescence lifetime of this transition and it will be used to determine the quantum efficiency of Ho^{3+}:KPb_2Cl_5. From the fluorescence spectrum, the emission cross section of the important manifold $^5I_7 \rightarrow ^5I_8(2.0\mu m)$ transition will be determined. The 8K absorption spectrum was examined as well. Selected manifolds were analyzed in terms of the crystal field splitting using a charge-compensation model first developed for Er^{3+} doped into KPb_2Cl_5. The optical and spectroscopic characteristics of Ho^{3+}:KPb_2Cl_5 show that this material has a potential for $2.0\mu m$ laser system.

Sreerenjini Chandrasekharan
University of Texas at San Antonio

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