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Judd-Ofelt analysis and crystal-field modeling of Er^{3+} transitions in $YAlO_3$ SREE R. CHANDRASEKHARAN, University of Texas at San Antonio, KELLY L. NASH, JOHN B. GRUBER, AND DHIRAJ K. SARDAR TEAM — Optical absorption and emission intensities are investigated for trivalent Er^{3+} ions in $YAlO_3$ crystal. The Judd-Ofelt model is applied to the room temperature absorption intensities of $Er^{3+}(4f^{11})$ transitions in $YAlO_3$ to obtain the intensity parameters which are then used to calculate the spontaneous emission probabilities, branching ratios, radiative decay rates, and radiative lifetimes of the Er^{3+} transitions from the upper multiplet manifolds to the corresponding lower-lying multiplet manifolds in $YAlO_3$. The room-temperature fluorescence lifetimes and the emission cross sections of selected intermanifold transitions are determined. From the calculated radiative lifetimes and the measured fluorescence lifetimes, the quantum efficiency of the sample has been found. The 8K absorption spectrum has been examined as well. Selected manifolds have been analyzed in terms of crystal field splitting using current models and minimization methods to establish the parameters of Er^{3+} in C_s symmetry sites. The optical and spectroscopic characteristics of Er^{3+}:$YAlO_3$show that this material has a potential for both 1.5μm and 544.96 nm stimulated emissions.

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