Abstract Submitted
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Analyses of the Ultraviolet Spectra of Er^{3+} in Er_2O_3 and Er^{3+} in Y_2O_3[1] SREERENJINI CHANDRA, JOHN B. GRUBER, UTSA, GARY W. BURDICK, Andrews University, DHIRAJ K. SARDAR, UTSA — The ultraviolet (uv) absorption spectra of trivalent erbium (Er^{3+}), representing transitions to all energy levels below 44500 cm^{-1}, have been analyzed for the crystal-field splitting of the multiplet manifolds of $Er^{3+}(4f^{11})$ in C_2 symmetry cation sites in single-crystal Er_2O_3 and Er^{3+}:Y_2O_3. A solid solution exists between the two compounds without altering the local symmetry, which allows us to identify the weaker transitions in Er^{3+}:Y_2O_3 from the stronger transitions observed in the uv spectrum of Er_2O_3. A total of 134 Stark levels representing 30 multiplets have been modeled using a parametrized Hamiltonian defined to operate within the $Er^{3+}(4f^{11})$ configuration. The crystal-field parameters were determined through use of a Monte Carlo method in which 14 independent crystal-field parameters were given random starting values and optimized using standard least-squares fitting between calculated and experimental levels. The consistent agreement between the experimental and calculated Stark levels in both crystals can be very useful for the ongoing research in intensity analyses and magneto-optical studies on these crystals.

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