LASER SPECTROSCOPY OF NEODYMIUM MONXIDE.

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Laser induced fluorescence spectra of ^{142}NdO have been excited using both fixed frequency argon ion and tunable ring dye lasers and detected at high resolution with a Fourier transform spectrometer. Nine low lying electronic states resulting from the $Nd^{+2}(4f^3 6s)O^{-2}$ configuration were detected of which four, the second lowest Ω = 2, 3 and 5 states, (2)2, (2)3, (2)5, and the lowest Ω = 6 state, (1)6, have been observed for the first time. In addition, new vibrational levels were observed in the lowest Ω = 5, (1)5 (v = 1) and second lowest Ω = 4, (2)4 (v = 1, 2) states. Abnormally large doubling in both Ω = 2 states has been attributed to interactions involving neighboring Ω = 1 and 0 states. Several perturbations were observed and used as an aid in assigning some of the states. Both the order and energies of the low lying states have been shown to be consistent with Ligand Field theory calculations. Rotational relaxation in several of the spectra has allowed calculation of accurate rotational constants for several states while, for other states, approximate parameters have been calculated from combination differences.