MODERATE RESOLUTION JET COOLED CAVITY RINGDOWN SPECTRA OF THE $\tilde{A}$ STATE OF NO_3 RADICAL

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The $\tilde{A}$-$\tilde{X}$ spectrum of NO_3 has been previously observed using cavity ringdown spectroscopy (CRDS) by Andrei Deev *et. al* under ambient conditions.[a] There the authors assigned a number of vibronic bands in the spectrum. However, under these conditions, hot-bands may be present and the spectrum becomes very congested at frequencies higher than $\sim$8700 cm^{-1} due to the density of vibronic states and the overlap of their rotational contours. In order to obtain more information about the $\tilde{A}$ state of NO_3 we recently obtained spectra from 7550 cm^{-1} to over 10000 cm^{-1} using our moderate resolution ($\simeq$ 0.05 cm^{-1}) jet cooled CRDS apparatus. Jet cooling in our apparatus reduces the rotational temperature to $<$30 K and eliminates vibrational hot bands greatly simplifying the spectrum. We are able to resolve and assign more than 15 vibronic features including a new assignment of the 3_0^1 band. Analysis of the ν_4 progression shows weak Jahn-Teller coupling in this mode. Anomalous band contours and anharmonic spacings are observed for the $\nu_1\nu_4$ combination bands and the cause is being investigated. We also see some features that could belong to vibronically forbidden transitions which may be magnetic dipole allowed.

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