

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

TERRANCE J. CODD, MING-WEI CHEN^a, MOURAD ROUDJANE and TERRY A. MILLER, *Laser Spectroscopy Facility, The Ohio State University, Columbus, Ohio 43210.*

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 $\sim 8700 \text{ cm}^{-1}$ 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 ($\simeq 0.05 \text{ cm}^{-1}$) jet cooled CRDS apparatus. Jet cooling in our apparatus reduces the rotational temperature to $< 30 \text{ K}$ 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.

^apresent address: University of Illinois at Urbana-Champaign, Urbana, IL 61801

^aA. Deev, J. Sommar, and M. Okumura, J. Chem. Phys. 122, 224305 (2005)