

LINE PARAMETERS OF NI₃ BETWEEN 4750 and 5250 cm⁻¹

L. R. Brown and J. S. Margolis, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Ca 91109

To support the interpretation of ground-based and spacecraft remote sensing, over 1500 NI₃ line positions, intensities, and empirical lower state energies were measured.

Laboratory spectra of NI₃ and enriched ¹⁴NI₃ and ¹⁵NI₃ were recorded at 0.011 cm⁻¹ resolution with signal to noise ratios of 900:1 or better using the Fourier transform spectrometer (FTS) located at the McMath telescope at Kitt Peak Nat'l Obs./ Nat'l Solar Obs. Multiple pressures and paths were used to observe transitions whose intensities cover four orders of magnitude. To obtain experimental lower state energies in the manner done previously for methane, cold sample spectra were recorded using absorption cells coolable to 180 K with optical path lengths from 0.80 m to 24.4 meters.

The measurement accuracy of an isolated spectral line is ± 0.00020 cm⁻¹ for the positions, $\pm 3\%$ for intensities and 6% for B . While the empirical lower states yielded additional quantum assignments for the two strongest bands, no attempt has been made to model the multi-state system in this region. A catalog of the resulting line parameters with assignments for the $\nu_1 + \nu_4$ and $\nu_3 + \nu_4$ bands of ¹⁴NI₃ and the $\nu_3 + \nu_4$ band of ¹⁵NI₃ will be submitted for inclusion in the 1994 HITRAN and GEISA molecular databases.

* The paper represents the results of one phase of research carried out at the Jet Propulsion Laboratory, under contract with the national Aeronautics and Space Administration.