THE ASSYMETRIC N-O STRETCH FUNDAMENTAL BAND OF NITROMETHANE: INTRAMOLECULAR VIBRATIONAL RELAXATION IN THE GROUND INTERNAL ROTOR STATE

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The rotationally resolved spectrum of the *b*-type band near 1584 $cm^{-1}$ of nitromethane has been recorded using a Bruker-120HR FTIR coupled to a continuous slit-jet expansion at PNNL. By means of ground state combination differences, 1600 lines have been assigned to transitions reaching the four lowest internal rotor states. Most of the assigned transitions reach the *m*=0 internal rotor state, which is affected by multiple rovibrational perturbations. Each zeroth order transition is split into a clump of 4 or 5 rovibrational transitions. Individual perturbing (dark) states are followed as a function of the *J*, $K_a$, and $K_c$ rotational quantum numbers. The clumps are the spectroscopic signature of intramolecular vibrational relaxation (IVR).