NEW LINE LISTS INCLUDING INTENSITIES FOR THE C_2 SWAN SYSTEM ($d^3\Pi_g$-$a^3\Pi_u$), C_2 SINGLET SYSTEMS AND ROVIBRATIONAL TRANSITIONS WITHIN THE NH $X^3\Sigma^-$ GROUND STATE.

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Line lists including both positions and absolute intensities are required by those who wish to calculate abundances from spectroscopic observations. New line lists for the diatomic molecules C_2 and NH are presented.

Line strengths for the C_2 Swan system ($d^3\Pi_g$-$a^3\Pi_u$) have been calculated for vibrational bands with v'=0-10 and v''=0-9, and J values up to J=34-96, based on previous observations in 36 vibrational bands. Line positions from several sources were combined with the results from recent deperturbation studies of the v'=4 and v'=6 levels, to provide updated molecular constants. The line strengths are based on a recent ab initio calculation of the transition dipole moment function. Einstein A coefficients and f-values were also calculated for the vibrational bands of the Swan system. A line list has been made available, including observed and calculated line positions, Einstein A coefficients and oscillator strengths (f-values). This list will be useful for astronomers, combustion scientists and materials scientists who utilize C_2 Swan spectra. Similar work is being carried out for a number of singlet systems of C_2, in which a single global fit of positions will be performed and intensities calculated.

For NH, a line list is being created for the infrared transitions within the $X^3\Sigma^-$ ground state, including previous observations of rotational lines within v=0-2, and rovibrational lines of the Δv=1 sequence up to v'=6. The intensity calculations use a recently calculated dipole moment function which has been used to calculate the lifetime of the v=1 level, but was unpublished. A line list like that for the C_2 Swan system will be made available, which will be useful for astronomers investigating NH and nitrogen abundance in cool objects.