Continous-wave cavity ringdown study of the $^{14}\text{N}_2^+$ Meinel system 2-1 band and the first positive band system of $\text{N}_2^*$

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We have observed the 2-1 vibronic band of the $\text{N}_2^+$ $A^2\Pi_u - X^2\Sigma_g^+$ system using continuous-wave cavity ringdown spectroscopy (cw-CRDS). The $\text{N}_2^+$ was formed in a positive column discharge of a mixture of $\text{N}_2$ and argon, and spectra were collected between 937 and 984 nm with a tunable external cavity diode laser. A total of 112 $\text{N}_2^+$ lines have been observed. In addition, more than 400 lines from the first positive band system of $\text{N}_2^+$ were also observed during this experiment. The relative intensities of the $\text{N}_2$ and $\text{N}_2^+$ bands were found to change with discharge cell pressure, and so each spectral region was observed at two different pressures to aid in distinguishing the spectra of these species. Both the $\text{N}_2^+$ and $\text{N}_2$ spectra have been assigned and the molecular constants have been determined for each species, and the interpretation of these spectra will be reported.