CAVITY RING-DOWN LASER ABSORPTION SPECTROSCOPY OF THE E $^3\Delta$ - X $^3\Delta$ TRANSITION OF VN

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The (0,0) band of the electronic transition of VN at around 450.5 nm has been investigated using the technique of laser vaporization/reaction with free jet expansion and cavity ring-down laser absorption spectroscopy. A new transition system was observed, which has been designated as the E $^3\Delta$ - X $^3\Delta$ system. All three $\Delta\Omega = 0$ subband transitions were recorded and rotationally analyzed. Least squares fit of the measured line positions yielded molecular constants for the new E $^3\Delta$ state. The bond length of the E$^3\Delta$ state was determined to be 1.6937 Å, which is the longest among the known states of VN. The E $^3\Delta$ state is expected to arise from an electronic configuration $1\delta^1 10\sigma^1$ where the 10σ orbital is an antibonding orbital. A comparison of the observed electronic states of the isoelectronic TiO molecule supports the assignment.