

# OBSERVATION AND ANALYSIS OF ION-PAIR TRANSITIONS OF I<sub>2</sub> COOLED IN A SUPERSONIC FREE-JET EXPANSION

J. TELLINGHUISEN, *Department of Chemistry, Vanderbilt University, Nashville, TN 37235*; X. ZHENG,  
F. FEI, and M. C. HEAVEN, *Department of Chemistry, Emory University, Atlanta, GA 30322*.

The  $A'$  state of I<sub>2</sub> was observed for the first time in a free-jet expansion, where it was prepared by ArF laser excitation of I<sub>2</sub>/Ar mixtures close to the nozzle <sup>a</sup>. Twenty-seven bands in the  $v'' = 0$  progression of the  $D' - A'$  transition were studied by laser excitation spectroscopy, leading to the following improved constants (cm<sup>-1</sup>) for the  $A'$  and  $D'$  states:

$$B_0'' = 0.028054, \quad B_e' = 0.020526, \quad \alpha_e' = 5.3 \times 10^{-5}, \\ \omega_e' = 103.953, \quad \omega_e x_e' = 0.2097, \quad \omega_e y_e' = 2.687 \times 10^{-4}.$$

Many bands of the  $\beta - A$  transition have also been observed. These originate from  $A, v'' = 0$ , and terminate on levels with  $25 \leq v' \leq 68$  of the  $\beta$  state. Full analyses of both band systems will be presented.

---

<sup>a</sup>J. Tellinghuisen, S. Fei, X. Zheng, and M. C. Heaven, *Chem. Phys. Lett.* 176, 373 (1991).

**Time required:** 15 min

**Session in which paper is recommended for presentation:** 8

**Comment:** Please schedule this paper immediately after the one by the same authors entitled "Bromine and Iodine Spectra

...