TA08 10 min 10:19

NEAR-INFRARED ELECTRONIC TRANSIENT ABSORPTION SPECTRUM OF METHYLENE
BOR-CHEN CHANG, MING WU, GREGORY E. HALL, AND TREVOR J. SEARS

Methylene (CH_2) has been the subject of numerous studies since Herzberg and Johns[1] first analyzed the $\tilde{b} \leftarrow \tilde{a}$ electronic spectrum in 1966. The electronic spectrum of CH_2 is complicated by singlet-triplet interactions between the $\tilde{a}$, $\tilde{b}$, and $\tilde{X}^3B_1$ states, the Renner-Teller effect between the $\tilde{a}$ and $\tilde{b}$ states, which correlate with a degenerate $^1\Delta_g$ state at the linear configuration, and spin-orbit coupling. Recently, Green et al.[2] reported a theoretical investigation of the CH_2 $\tilde{b} \leftarrow \tilde{a}$ electronic spectrum. In this study, they predicted the positions of many more vibronic bands than were observed by Herzberg and Johns.[1] Although the visible spectrum of CH_2 has been quite extensively studied, there are very few experiments in near-IR region due to less efficient dye laser operation at longer wavelengths. We have constructed a Ti:sapphire laser based transient absorption spectrometer and have measured the CH_2 $\tilde{b} \leftarrow \tilde{a}$ electronic spectrum between 11400 and 12500 cm^{-1} at Doppler limited resolution. Our spectrum has indeed shown more lines than the previous report.[1] Furthermore, reassignments of several previously observed[1] bands suggested by Green et al.[2] have been confirmed. The analysis is still in progress. The new experimental data and current state of the analysis will be presented.

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2. W. H. Green, Jr., N. C. Handy, P. J. Knowles, S. Carter, *J. Chem. Phys.* **94**, 118 (1991).

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INTERMISSION

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TA09 10 min 10:50

LASER OPTOGALVANIC TRANSITIONS OF NEON IN THE NEAR ULTRAVIOLET AND VISIBLE,*
P. MISRA, X. ZHU, AND A.H. NUR

A pulsed tunable dye laser has been used to excite over 350 optogalvanic (OG) transitions in the wavelength region 337-598 nm using a commercial Fe-Ne hollow cathode discharge lamp. Around 220 of these OG transitions have been identified to be associated with energy levels belonging to neon. Interference fringes obtained simultaneously employing a low-finesse etalon have permitted calibration of the dye laser frequency to within an estimated accuracy of 0.3 cm^{-1}. Several of the observed OG transitions originate from metastable states of neon. A digital oscilloscope was used to record the waveforms of the OG transitions. Polarities of 29 identifiable neon transitions observed in the near UV and visible are understood in terms of processes that affect the population of atoms in metastable states. The OG signals together with the etalon fringes have made possible accurate calibration of rotationally-resolved laser excitation spectra of free radicals in a supersonic jet environment.

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