NEW ASSIGNMENTS IN THE NEAR INFRARED SPECTRUM OF METHYLENE

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Transitions to five previously unobserved levels, have been identified in a newly recorded region ($10\,000\,\mathrm{cm}^{-1}$ - $10\,600\,\mathrm{cm}^{-1}$) of the near infrared spectrum of the $\tilde{b}\,^1B_1 \leftarrow \tilde{a}\,^1A_1$ system of CH_2. Four states were observed via transitions from the $\tilde{a}(0,0,0)$ state: $K = 1$ $\tilde{a}(0,9,0)$, $K = 2$ $\tilde{b}(0,1,0)$, $K = 2$ $\tilde{a}(1,6,0)$, and $K = 3$ $\tilde{b}(0,1,0)$, and one via hot-band transitions from the $\tilde{a}(0,1,0)$ state: $K = 3$ $\tilde{a}(0,10,0)$. The observation of levels with predominantly $\tilde{a}$ state character is dependent on strong Renner-Teller coupling of the two singlet states which correlate to a $^1\Delta_g$ state at linearity. Hot band transitions to two other states previously identified at shorter wavelengths are observed. Comparison with recent theoretical calculations[a,b,c] shows good agreement in most cases. These assignments still account for only approximately 20% of the lines observed in this region; speculations on the identity of the unassigned transitions will be discussed.

[a] P. Jensen, M. Brumm, W. P. Kraemer, and P. R. Bunker, J. Mol. Spectrosc. <u>171</u>, 31 (1995).
[b] W. H. Green, Jr., N. C. Handy, P. J. Knowles, and S. Carter, J. Chem. Phys. <u>94</u>, 118 (1991).
[c] G. Duxbury, A. Alijah, B. D. McDonald, and Ch. Jungen, J. Chem. Phys. <u>108</u> , 2351 (1998).