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 $\tilde{\mathrm{b}}\,^1B_1 \leftarrow \tilde{\mathrm{a}}\,^1A_1$ system of CH_2. Four states were observed via transitions from the ã(0,0,0) state: $K = 1$ ã(0,9,0), $K = 2$ $\tilde{\mathrm{b}}$(0,1,0), $K = 2$ ã(1,6,0), and $K = 3$ $\tilde{\mathrm{b}}$(0,1,0), and one via hot-band transitions from the ã(0,1,0) state: $K = 3$ ã(0,10,0). The observation of levels with predominantly ã 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.

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