SINGLET TRANSITIONS OF METHYLENE AT 890 nm

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The near-infrared spectrum of CH_2 ($\tilde{b}^1B_1$ - $\tilde{a}^1A_1$) was observed using frequency-modulated diode laser absorption spectroscopy. Rovibronic transitions between 11038 cm^{-1} and 11370 cm^{-1} were assigned based on the known lower state combination differences. On the basis of comparison with published results of quantum chemical calculations including the Renner-Teller effect, three upper rovibronic levels were assigned possessing both $\tilde{a}$ and $\tilde{b}$ primary electronic wavefunction character: K = 1 $\tilde{b}$(0,2,0), K = 1 $\tilde{a}$(1,7,0), and K = 4 $\tilde{b}$(0,2,0). Transitions involving J as high as 8 were observed in K = 1 $\tilde{b}$(0,2,0). In addition to further characterizing the CH_2 bending potential surfaces near the barrier to linearity, the analysis also extends the rotational number of ground state levels that are accurately known.

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