NEAR-INFRARED DOUBLE RESONANCE SPECTRUM OF THE CH_2 $\tilde{b}\leftarrow\tilde{a}$ ORIGIN BAND

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Since Herzberg and Johns reported the first observation of the CH_2 $\tilde{b}\leftarrow\tilde{a}$ singlet-singlet transition, there have been numerous experimental and theorectical investigations of this system. Although the spectrum of the CH_2 $\tilde{b}\leftarrow\tilde{a}$ transition has now been studied from the ultraviolet to the near-infrared (NIR), the origin band has not previously been observed due to a poor Franck-Condon factor as well as the lack of a convenient high resolution light source at approximately 1.2 μm. Here we report the successful observation of the origin band of the CH_2 $\tilde{b}\leftarrow\tilde{a}$ system using a NIR-NIR double resonance technique. Based upon our results, effective rotational constants for the $\tilde{b}$ (0,0,0) level can be determined. The level positions also provide information that can be used to improve the potential energy surface for the $\tilde{b}$ state. Singlet CH_2 is one of very few polyatomic molecules for which continuous high resolution data exist for rovibronic levels from the zero-point level of the $\tilde{a}$ state through to predissociation.

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