

## THE NEAR-INFRARED SPECTRUM OF HCB<sub>r</sub> REVISITED

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High resolution measurements of many new bands in the  $\tilde{A}^1A'' \leftarrow \tilde{X}^1A'$  system of bromomethylene have been made by transient absorption spectroscopy using a frequency modulated tunable diode laser. In particular, the doubly excited bending hot band in DCBr, between 10300 and 10550 $\text{cm}^{-1}$ , has been completely rotationally assigned. Its rotational branches indicate that the upper level has rotational structure characteristic of a bent molecule, in contrast to most of those observed previously. The position of this band, together with the rotational assignment of several others in both HCB<sub>r</sub> and DCBr has led to a correction of the vibrational numbering for all previously observed bands involving bending vibrational excitation in the system. This reconciles an inconsistency noted previously.<sup>a,b</sup> Definitive evidence for the position of the low-lying  $\tilde{a}^3A''$  state of HCB<sub>r</sub> remains elusive, but the position (approx. 2310  $\text{cm}^{-1}$ ) of the (020) level in HCB<sub>r</sub> and its rotational structure do imply that it is perturbed and the triplet state seems the only likely candidate for the perturbing level.

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<sup>a</sup>S. Xu, K. A. Beran and M. D. Harmony, *J. Phys. Chem.*, 98, 2742 (1996).

<sup>b</sup>A. J. Marr, S. W. North, T. J. Sears, L. Ruslen and R. W. Field, *J. Mol. Spec.* 188, 68 (1998).