

Electronic supplementary material S2 to

High resolution spectroscopy of asymmetric top molecules in nonsinglet electronic states: The ν_3 fundamental of chlorine dioxide ($^{16}\text{O}^{35}\text{Cl}^{16}\text{O}$) free radical in the X^2B_1 electronic ground state

Nonzero matrix elements of the $^{(2)}H_{sp-rot}^v$ spin-rotational operator:

$$\begin{aligned} \langle NK\gamma, SJ | ^{(2)}H_{sp-rot}^v | NK\gamma, SJ \rangle &= \left\{ \frac{a_0}{2} + \frac{a}{2} \frac{K^2}{N(N+1)} - \delta_{K,1} \frac{b}{4} (-1)^\gamma \right\} \\ &\times \{J(J+1) - N(N+1) - S(S+1)\}, \end{aligned} \quad (1)$$

$$\begin{aligned} \langle NK\gamma, SJ | ^{(2)}H_{sp-rot}^v | NK \pm 2\gamma, SJ \rangle &= -b[(1 - \delta_{K,0})(1 - \delta_{K,2}\delta_{\Delta K,-2}) \\ &+ \sqrt{2}(\delta_{K,0} + \delta_{K,2}\delta_{\Delta K,-2})] \frac{J(J+1) - N(N+1) - S(S+1)}{4N(N+1)} \\ &\times \{(N \mp K)(N \pm K + 1)(N \mp K - 1)(N \pm K + 2)\}^{1/2}, \end{aligned} \quad (2)$$

$$\begin{aligned} \langle N - 1K\gamma, SJ | ^{(2)}H_{sp-rot}^v | NK\gamma' \neq \gamma, SJ \rangle &= -a \frac{K}{2N} \\ &\times \left\{ \frac{(N^2 - K^2)(N - J + S)(N + J + S + 1)(S + J - N + 1)(N + J - S)}{(2N - 1)(2N + 1)} \right\}^{1/2}, \end{aligned} \quad (3)$$