elements of the transition. The temperature dependence of the effect consists of two parts: the first part is proportional to $c(T, \omega)$ and therefore constant at high temperatures, the second part is due to the off-centre distortion and decreases with $1/T$ in the high-temperature range (Fig. 5).

Since the stress transforms as Γ_1^-, Γ_3^+, and Γ_5^+, all terms of the interaction Hamiltonian of the stress-distorted complex which are linear in q_1^+, $q_{3\,i}^+$, and $q_{5\,i}^+$ are changed. Having not observed a splitting of the absorption bands, we may neglect these terms in the linear electron–lattice interaction. In the quadratic electron–lattice interaction new terms appear, the transformation properties of which for stress in [001] direction are given by [13]

$$\begin{aligned} H_2 = {} & Q_{4\,x}^- \, \Delta Q_{3,1}^+ \left\{ -\frac{1}{2}\,(x) - \frac{\sqrt{3}}{2}\,(y\,z) \right\} V_{3,4} + \\ & + Q_{4\,y}^- \, \Delta Q_{3,1}^+ \left\{ -\frac{1}{2}\,(x) + \frac{\sqrt{3}}{2}\,(x\,z) \right\} V_{3,4} + \\ & + Q_{4\,z}^- \, \Delta Q_{3,1}^+ \{(z)\}\, V_{3,4} \,. \end{aligned} \tag{16}$$

$\Delta Q_{3,1}^+$ is the distortion coordinate of the lattice cell, and proportional to the applied stress. Using the same scheme which led to (10) and (11) we get mixed terms with (3a), being linear functions of stress. We obtain an additional term, which has to be added to the first column of Table 1:

$$\left.\begin{aligned} \frac{f_{\parallel} - f_{\perp}}{f}\Big|^{(3\,a)}_{\Gamma_1^+ \to \Gamma_4^+(\Gamma_5^+)} &= \frac{3}{2}\,\frac{\alpha}{A}\,\Delta Q_{3.1}^+ = C_{4,5}\,, \\ \frac{f_{\parallel} - f_{\perp}}{f}\Big|^{(3\,a)}_{\Gamma_1^+ \to \Gamma_3^+} &= -\,3\,\frac{\alpha'}{A'}\,\Delta Q_{3.1}^+ = C_3\,. \end{aligned}\right\} \tag{17}$$

α, α' and A, A' are reduced matrix elements. We find that the relative change of the oscillator strength by uniaxial stress due to the quadratic electron–lattice interaction does not depend on temperature (Fig. 5), but in contrast to the effects of the linear electron–lattice interaction it depends on the matrix elements of the transition.

4. Discussion

We compare the absorption change ΔK of Fig. 1 and 2 with the theoretical expressions for the change of the zeroth moment stated in Table 1. The experimental values of ΔK, which are positive and negative, do not change sign within a single band. This leads to the conclusion that the main effect is due to linear electron–lattice interaction which clearly shows a difference in sign between Δf of a $\Gamma_1^+ \to \Gamma_3^+$ transition and Δf of $\Gamma_1^- \to \Gamma_4^+(\Gamma_5^+)$ transitions. Because of the transformation properties of the stress tensor, no distinction between Γ_4^+ and Γ_5^+ is possible by stress measurements.

We first discuss the B-band of KCl:Ag^+ assuming the resonance mode splitting to be the dominant effect. When a [001] stress of 100 kp/cm^2 is applied we find from this band a relative splitting $\Delta\omega/\omega = 2.5 \times 10^{-2}$ of the resonance mode at 38.8 cm^{-1}. The relative change of the oscillator strength for stress in [111] and [011] direction is smaller than 1/10 of the change for [001] stress, which implies a relative splitting of the resonance mode smaller than 2.5×10^{-3}. This is in good agreement with the small value of δ_5 (Fig. 4) found by Busse [11] in NaCl:Cu^+, and signifies a very weak interaction between the defect and the