Alternatively, some other modification of the SBW theory may be required. For example, Peissker (1965) has suggested that the rate 'constant' $\dot{\epsilon}_0$ in eqn. (1) may be stress dependent, i.e. the density of potential cross slip sites $=f(\tau)$. Following Peissker's approach, $\dot{\epsilon}_0 \propto \tau_{III}{}^m$ and $2 \geqslant m \geqslant 0$. Equation (4) then becomes

$$Z=(\beta\gamma kT/G^2b^4)(1+m\beta\gamma kT/G^2b^4)^{-1}. \quad . \quad . \quad . \quad . \quad . \quad (7)$$

If we denote the right-hand side of eqn. (6) as S and assume m is independent of pressure, from eqn. (7) we have

$$(\partial \ln Z/\partial P)=S-mZS. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (8)$$

With $m=2$, $Z_{1\,\mathrm{atm}}=0{\cdot}22$, and $S=0{\cdot}005/\mathrm{kb}$ (eqn. (6)), eqn. (8) yields $(\partial \ln Z/\partial P)_{1\,\mathrm{atm}} \simeq +0{\cdot}003/\mathrm{kb}$, i.e. the result of eqn. (6) is modified only slightly. If, in eqn. (8), $m \simeq 200$ we find $(\partial \ln Z/\partial P)_{1\,\mathrm{atm}} \simeq -0{\cdot}2\,\mathrm{kb}^{-1}$, in agreement with our experimental results. Such a large value of m is physically unreasonable, however, because it simultaneously requires that the parameter A in eqn. (1) be negative. In addition to this serious complication we can show that $(\partial \ln \tau_{III}/\partial P)$ is not a function of m. Hence even on introducing $\dot{\epsilon}_0 \propto \tau_{III}{}^m$ we cannot thereby rationalize the rapid decrease of τ_{III} with pressure. It is uncertain how else the SBW theory might be modified to explain the present data.

The difficulties encountered here in the application of the SBW theory to pressure effects in NaCl have a parallel in the case of some f.c.c. alloys. Gallagher (1968) and Gallagher and Liu (1969) have examined the change of γ on addition of Zn to Ag as determined from extended node measurements and as deduced from the SBW theory. In the latter case values of γ are calculated from the strain rate sensitivity of τ_{III}; in the above we have simply followed the inverse procedure of calculating $(\partial \ln \tau_{III}/\partial \ln \dot{\epsilon})$ versus P given a predicted change of γ with pressure. For Ag–Zn, extended node measurements indicate a smooth decrease of γ with increasing electron to atom (e/a) ratio; the τ_{III} method indicates an increase in γ (by a factor of 2) up to $e/a \simeq 1{\cdot}02$ followed by a decrease at larger e/a. That is, while γ is actually decreasing, the strain rate sensitivity of τ_{III} (and, according to eqn. (4), γ) is increasing. Gallagher and Liu conclude that the SBW theory does not yield a satisfactory quantitative explanation of dynamic recovery in these f.c.c. alloys; the present results indicate that the same is also true for NaCl.

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