

much more under surface tension that do short, thick samples; it is possible that this contraction compensated the void formation. An attempt was made to polish some of our samples to look for voids, but the results were inconclusive; voids were certainly not present in such high concentrations on the cathode side as was the case with silver. Some voids were observed in GRÖNE's samples⁽¹⁰⁾ but were not convincingly distributed. Recent work by HERZIG⁽¹¹⁾ with stacks of copper foils indicated that impure copper shows a reversal whereas pure copper does not.

In conclusion, it appears that there is no intrinsic reversal in marker motion at high temperatures for pure copper. There was no tendency for the marker velocity to decrease in the hot regions, or even to slacken its exponential increase with temperature; the maximum temperatures of this experiment were well above those where previous reversals were observed. The reason for the reversal observed in previous work is still not clear.

Acknowledgements—The author wishes to thank Mr. FELIX DUPONT for assistance in the computations, and is indebted to Dr. H. B. HUNTINGTON for suggesting the work and making the research possible.

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References

1. WEVER H., *Z. Elektrochem.* 60, 1170 (1956).
2. GRÖNE A. R., *J. Phys. Chem. Solids* 20, 88 (1961).
3. KUZ'MENKO P. P., *Ukr. Fiz. Zh.* 7, 117 (1962).
4. SULLIVAN G. A., *Bull. Am. Phys. Soc.* 11, 184 (1966); *Phys. Rev.*, to be published.
5. SIMMONS R. O. and BALLUFFI R. W., *Phys. Rev.* 129, 1533 (1963).
6. HUNTINGTON H. B. and GRÖNE A. R., *J. Phys. Chem. Solids* 20, 76 (1961); HUNTINGTON H. B. and HO S. C., *J. Phys. Soc. Japan* 18, suppl. 2, 202 (1963).
7. PENNEY R. V., *J. Phys. Chem. Solids* 25, 335 (1964).
8. KUPER A., LETAW H. JR., SLIFKIN L., SONDER E. and TOMIZUKA C. T., *Phys. Rev.* 96, 1224 (1954).
9. HO P. S. C., Ph.D. Thesis, Rensselaer Polytechnic Institute, 1964; Ho, P. S. and HUNTINGTON H. B., *J. Phys. Chem. Solids*, 27, 1319 (1966).
10. GRÖNE A. R., Hudson Valley Community College, Troy, N.Y. (Private communication).
11. HEUMANN TH., Munster University, Munster, West Germany (Private communication).

J. Phys. Chem. Solids Vol. 28, pp. 350-351.

Lattice dynamics and the NaCl-CsCl transformation in RbI

(Received 20 July 1966)

It has been suggested⁽¹⁻³⁾ that the spontaneous transformation of RbI from the NaCl to the CsCl structure at high pressure occurs via a structural instability caused by vanishing of the frequency of the transverse acoustic lattice vibrational mode at the center of the $\langle 100 \rangle$ zone face, at a pressure near that of the transformation. This problem is discussed and very much extended by HARDY and KARO.⁽³⁾ Their results indicate that, for appropriate choice of interionic interactions, as the solid is compressed toward the transition conditions the acoustic branches of the lattice vibrational spectrum are strongly shifted to lower energies while the optical branches are shifted slightly to higher energies as shown in Fig. 2 of HARDY and KARO.⁽³⁾ The purpose of this note is to point out that the results quoted are strongly inconsistent with the observed values⁽⁴⁻⁶⁾ of thermal expansion of RbI if the energy shifts calculated are linear over the pressure range to the transition.

Taking the familiar Quasi harmonic oscillator⁽⁷⁾ point of view the lattice excitations are considered to be those of a set of nearly harmonic oscillators which exhibit a volume dependence of their characteristic energies. This approximation leads to the result for "Grüneisen's Gamma":

$$\gamma_G \equiv \frac{\alpha B_T V}{C_v} = \frac{\sum_i \gamma_i C_{vi}}{\sum_i C_{vi}}$$

in which α is the thermal expansion coefficient, B_T is the Bulk Modulus C_v/V is the heat capacity per unit volume,

$$\gamma_i \equiv \frac{d \ln \nu_i}{d \ln V}$$

a so called "mode gamma", ν_i is any lattice vibrational frequency and C_{vi} is the Einstein heat capacity of the i 'th mode at the temperature of observation. The summation is over all oscillators making up the crystal vibrational spectrum. At high temperature each oscillator is classically