law to the solid at the melting point. These data suggest that the assumptions underlying the evaluation of the Grüneisen parameter from the equation of state on the Debye model are met reasonably well by elementary solids, on the average.

V. CONCLUSION

The results obtained show that formal consideration of finite strain leaves the evaluation of the Grüneisen parameter from the equation of state unaltered, for either a Debye solid or a Druyvesteyn-Meyering solid. Hence, no reason exists on the basis of the theory of finite strain for the arbitrary modification in the evaluation of the parameter for a Debye solid, as proposed by Dugdale and MacDonald. This statement presupposes that the wave amplitudes of the lattice vibrations are infinitesimal. It is not denied that an intrinsically anharmonic theory, such as that of Born and Brody[21] or of Hooton,[22] may demand revision of the value of the Grüneisen parameter as determined from the equation of state, but such a model likewise requires revision of the value of the characteristic frequency, as fixed by Eq. (8) on the Debye theory. Underlying the definition of the Grüneisen parameter is the postulate that all lattice frequencies vary with volume in the same manner; it is not obvious, *a priori*, that this requirement can be met within the framework of an essentially anharmonic theory.

The development of I, II, and III is based on the Debye-Waller theory derived from the Debye model, in contrast to the original Lindemann theory based on an Einstein model. Since the form of Grüneisen parameter taken in the papers in question corresponds to the Debye theory, it is felt that in this respect the results have been justified fully.

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Auger Electron Emission in the Energy Spectra of Secondary Electrons from Mo and W

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With the aim of determining to what extent the energy distribution of secondary electrons from targets of Mo and W may contain fine structure, measurements have been made using primary energies from 100 to 2000 electron volts. An electrostatic analyzer of the 127-degree type having an experimentally determined resolution of one percent was used. Observations of the pressure in the vacuum system, after heating the target above 2000°K and cooling to room temperature, showed that an energy spectrum could be recorded before formation of the first monolayer of contamination on the target surface.

Energy distribution measurements revealed: (1) Several subsidiary maxima at fixed differences in energy from the primary energy, these differences being characteristic of the target material and independent of the primary energy itself. (2) Several subsidiary maxima in the energy distribution at fixed positions along the energy scale lying between 10 and 500 electron volts, characteristic of the target material, and independent of the primary voltage. The maxima described in (1) are considered to be primary electrons reflected after suffering discrete losses of energy to the target. These discrete losses are believed to indicate the positions of the higher energy levels of the target material. The maxima described in (2) are interpreted as Auger electrons. Combining the energy level values determined from the discrete loss measurements with energy values for the deeper lying levels available from x-ray studies, it is possible to predict the energies with which Auger electrons might be expected to be emitted. Some of the predicted energies for Auger electrons agree reasonably well with with the energies observed experimentally both for Mo and for W.

I. INTRODUCTION

THE general shape of the energy distribution of secondary electrons from a metal target is that of a smooth curve whose two principal features are a large maximum of slow secondaries occurring near two or three volts and a sharper, usually smaller maximum, caused by elastically reflected primaries. Furthermore, several workers have observed some fine structure in the energy spectrum of secondaries from a number of different metals. Rudberg,[1] studying Cu, Ag, and Au, reported inelastic reflection of primary electrons that had suffered discrete losses of energy, these losses being independent of the primary energy and characteristic of the target material. Haworth[2,3] made similar observations for targets of Mo and Cb but observed further that

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