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A Determination of the Adiabatic Elastic Constants of Quartz

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values. The M_1 edges occasionally have a small discrepancy while the M_2 and M_3 edges seldom show any. Siegbahn and Phelps have suggested that the final levels in the edge transitions are valence and low lattice levels and that the selection rule $\Delta l = \pm 1$ is usually giving the transition preference. A change in atomic spacing of a metal, such as often results from alloying it, should produce a change in the energies of its lattice levels. The gold M_5 and M_4 edges from gold and from a 50 atomic per cent copper gold alloy were photographed in a vacuum spectrometer. Significant shifts to higher energies in M_5 of 2.5 electron volts and in M_4 of 6.8 volts were found. These results show that the final levels in M absorption transitions are lattice levels, and they give credence to the assumption that there are preferred atomic to lattice level transitions.

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MEASUREMENT OF YOUNG'S MODULUS WITH SMALL STRESS

E. P. T. TYNDALL

A modification of the apparatus previously described by Van Allen has been designed and used for measurements on zinc and lead crystals.

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A DETERMINATION OF THE ADIABATIC ELASTIC CONSTANTS OF QUARTZ

PHILIP J. HART

If the elastic constants of a homogeneous, anisotropic material are known, it is possible to calculate the theoretical frequencies of the different modes of vibration between the faces of an infinite plate of the material. Conversely, knowing the frequencies of sufficient modes of vibration, it is possible to calculate the elastic

constants. The frequencies of vibration of higher harmonics of finite plates, divided by the order of the harmonic, should approach very close to the frequency of the theoretical infinite plate.

Plates of quartz were accurately oriented and cut from well-developed, flaw-free quartz crystals and the frequencies of higher-harmonic piezo-electric vibrations were accurately determined. With this information, the six adiabatic elastic constants of quartz were evaluated.

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ELASTICITY OF LEAD CRYSTALS

A. F. DEMING

Additional measurements have been made on the Young's Modulus of lead single crystals. The value of the modulus depends on the orientation of the length of the specimen relative to the crystallographic axis. This relationship will be shown.

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RELATIVE INTENSITIES OF FLUORESCENCE AT LOW TEMPERATURES

J. E. DINGER

The change in intensity of fluorescence of ZnSiO_3 , CaWO_4 , CdB_2O_5 , was measured at various temperatures between room temperature and the temperature of liquid oxygen. The fluorescence was excited by means of the 2537 Å line of a mercury arc. Microphotometric measurements were made on photographs of the fluorescent spectra. The results indicate a decrease in intensity with decrease in temperature of the CdB_2O_5 and the fluorescence of ZnSiO_3 passes through a maximum of intensity between room temperature and liquid oxygen temperature.

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