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Determination of Linear Coefficients of Thermal Expansion of Thin Samples by Optical Lever

John E. Gorham
Iowa State College

George C. Higgins
Iowa State College

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million per degree centigrade for the African specimen and 28.1 parts per million per degree centigrade for the California crystal. Comparison of the tourmaline plates with a Y-cut quartz plate of the same size and frequency shows the tourmaline oscillators decidedly inferior on the basis of power output.

IOWA STATE COLLEGE,
AMES, IOWA.

A NEW METHOD FOR DETERMINING THERMIONIC WORK FUNCTION OF METALS AND ITS APPLICATION TO NICKEL

GERALD W. FOX AND ROBERT M. BOWIE

A new method for determining thermionic work functions of metals has been developed and may be stated as follows: The metal sample has the approximate form of a sphere and is heated by electron bombardment from an auxiliary filament that is disconnected when measurements are made. As the sample cools the electron emission from it charges a condenser, which, at predetermined times, is discharged through a ballistic galvanometer. A Pt, Pt + 10 per cent Rh thermocouple, spot welded to the sample, measures its temperatures. The values of the thermionic constants are obtained by use of the equation:

$$\log_{10} (T^2/SQ) = \log_{10} (2.3/aA) + \Phi/ (1.988 \times 10^{-4}T)$$

where Q is the quantity of charge yet to flow on cooling the sample to absolute zero and $-S$ is the slope of the log Q-time curve. This equation is derived from Richardson's.

For thoroughly outgassed nickel, this method yields $\Phi = 5.03 \pm .05$ volts and $A = 1.38 \times 10^3$ amps/cm^2 degree^2. The value for Φ agrees well with photoelectric determinations.

PHYSICS LABORATORY,
IOWA STATE COLLEGE,
AMES, IOWA.

DETERMINATION OF LINEAR COEFFICIENTS OF THERMAL EXPANSION OF THIN SAMPLES BY OPTICAL LEVER

JOHN E. GORHAM AND GEORGE C. HIGGINS

In order to measure coefficients of thermal expansion of small samples varying from one to twenty millimeters in thickness an

optical lever has been designed to allow detection of a change in thickness of the sample of plus or minus twenty Angstrom units. The dilatation is read in terms of the change of interference bands produced between two nearly parallel glass plates. A formula was developed which does away with continuous observation during the expansion. Through the use of this formula the accuracy of the result is comparable with that obtained by continuous observation. The samples do not have to be ground to a specified size, nor do they have to be optically flat. Adjustment of the sample in the apparatus requires about fifteen minutes.

IOWA STATE COLLEGE,
AMES, IOWA.

AN APPARATUS FOR THE DEMONSTRATION OF MALUS LAW, USING THE PHOTRONIC CELL

ROBERT G. WILSON

This apparatus is a further development of that designed by Dr. Weld of Coe College. The principal change is that of using a photronic cell to measure the light intensity.

The apparatus was designed especially for use in advanced optics courses. It can be operated easily by an advanced student and gives very accurate results with a minimum of simple adjustment.

The photronic cell provides a quick, direct method of measuring the light. The student gets an introduction to photo-electricity through its use in the experiment.

The apparatus provides a practical method of demonstrating the action of any kind of polarizer-analyzer combination.

IOWA STATE COLLEGE,
AMES, IOWA.

A METHOD OF OBTAINING ABSOLUTE VALUES FOR X-RAY ENERGY LEVELS

JOHN A. ELDRIDGE

X-ray absorption edges usually correspond to the removal of the orbital electron to some definite outer level, not to complete ionization. The difference between this state and the state of com-

