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A Method for the Production of Longitudinal Sound Vibrations in a Rod

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A NOTE ON THE THEORY OF X-RAY DIFFRACTION
IN LIQUIDS AND AMORPHOUS SOLIDS BY
RAMAN AND RAMANATHAN

E. H. COLLINS

(*ABSTRACT*)

Recently C. V. Raman and K. R. Ramanathan have published a theory which attempts to explain the greatly increased scattering of monochromatic radiation from liquids, which usually occurs at some angle or angles in the angular region 7° to 12° from the x-ray beam. The theory considers that this increased scattering is due to a certain degree of regularity existing between molecules which can be estimated thermodynamically from the compressibility of the fluid. The intensity of the scattered radiation can be computed from a formula which is given. Practically the only experimental verification of his theory is a curve published by Hewlett on the scattering of x-rays from liquid benzene. The agreement of Raman and Ramanathan theory with the published curve is very striking. It is found, however, that when the resolving power of the x-ray spectrometer is increased that the single peak observed by Hewlett shows a complicated structure of at least two and perhaps more peaks. The theory predicts that the peak will be asymmetrical in nature, i.e., very steep and sharp on the small angle side but less steep on the side toward the large angles. The asymmetrical nature of the peaks is not noticed. From the lack of agreement with experimental facts and from certain theoretical considerations the conclusion is reached that the theory is not adequate to explain the observed results.

UNIVERSITY OF IOWA.

A METHOD FOR THE PRODUCTION OF LONGITUDINAL
SOUND VIBRATIONS IN A ROD

WILLIAM D. CROZIER

In connection with some work being done in the testing of acoustic wave filters in solid media, a method has been developed for the production of longitudinal sound vibrations in a rod. Electrical oscillations are generated in a vacuum tube oscillator,

pass through two stages of power amplification, and are used as the input to a special oscillator attached to the end of the rod. This oscillator is similar in principle and construction to the Fessenden oscillator used in submarine sound signalling. Vibrations which have a fair purity of tone, and which have a considerable intensity over a wide range of frequencies are obtained in the rod.

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APRIL 8, 1924.

PRELIMINARY REPORT ON THE OPTICAL PROPERTIES OF MAGNESIUM

M. E. GRABER

The present research on the optical properties of single magnesium crystals was carried forward in the laboratories of the University of Iowa under the direction of Prof. L. P. Sieg. Employing the crystelliptometer, plane polarized monochromatic light was reflected from the crystal surface and the resultant elliptically polarized light analyzed to determine the phase and azimuth angles of its components. The crystals were studied in two positions: parallel and perpendicular, respectively, to the principle axis of the crystal, and two sets of optical constants (index of refraction, absorption index and reflecting power) were determined. Within the range of wave lengths studied (4160-6500A), the indices of refraction were:

First position, 0.25 to 0.36; second position, 0.30 to 0.44. The reflecting powers ranged from 63% to 80%, and the absorption indices from 3.6 to 7.

ELECTRICAL CONSTANTS OF DIELECTRICS FOR RADIO FREQUENCY CURRENTS

R. V. GUTHRIE, JR.

The electrical constants of dielectrics are the power factor and the dielectric constant, the power factor being that of a carefully insulated condenser using the given material as the dielectric. Losses in a condenser may be represented either as a series or a parallel resistance. If considered as in series, the losses may be determined by resistance variation, and if in parallel, the geometric capacity may be determined. From a consideration of