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Acoustic Wave Filters in Solids

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A SUMMARY OF RECENT EXPERIMENTS ON THE RELATION BETWEEN DIRECT AND CALCULATED REFECTING POWERS OF CRYSTALS OF TELLURIUM [1]

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(ABSTRACT)

By the employment of a micro-spectrophotometer it has been shown that Van Dyke's[2] results, obtained by the indirect method of elliptical analysis, are substantiated. The region of the spectrum covered in this determination of the principal reflecting powers of tellurium extends from 4400 A°. u. to 6600 A°. u. The writer[3] has described elsewhere the apparatus and method used.

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The purpose of the work was originally to extend work of Dr. G. W. Stewart on Acoustic Wave Filters in Air to the case where the transmitting medium is a solid. Due to the fact that transmission in solids consists of two types of waves, it is not possible to apply the original theory and recourse must be had, at least in the first instance, to experiment. The problem thus became one of finding an empirical formula which would aid in working out a special approximate theory for these filters.

A filter built of brass rod conductors, with two branches fitting tightly on it at definite points on the rod was found to have the desired action. Several of these filters were built, the side branches being in general either in the shape of plates, or approximately spherical. The curves plotting frequency against transmission were plotted for each filter. From these curves the general relations between the volume of the branch and the apparent cut off frequency were worked out.

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1 A full account of this work will be found in the Jour. Opt. Soc. of Amer., and Rev. Sci. Instr., 7, p 147, 1923.

2 J. O. S. A. and R. S. I., 6, p 917, 1922.

3 J. O. S. A. and R. S. I., 6, p 448, 1922.

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