

Report on thesis submitted by Mr. K. S. Krishnan

The main thesis on magnetic susceptibilities of crystals in relation to crystal structure is an able piece of experimental work, well designed & well executed, which covers a wide field of investigation in an exhaustive & masterly fashion. The supplementary thesis contains many well known papers, written by the candidate in collaboration with Professor C. V. Raman, on the discovery & investigation of the Raman effect, as well as on other questions in optics. It also contains many notable papers by the candidate himself on various important optical & magnetic subjects. The record of the candidate's work, considered as a whole, is most impressive. I regard him as one of the foremost Indian physicists & have no hesitation whatever in recommending that he should be awarded the D. Sc degree.

(Sd) O. W. Richardson

The essential significance of the observations made; of soundness & thoroughness in developing complicated theoretical arguments (as in connection with the effect of molecular anisotropy on the properties of fluids); and of a general lively interest in diverse phenomena even lying off the main lines of the investigations.

The main thesis, on the 'Magnetic susceptibilities of Crystals in Relation to Crystal Structure' represents in design & execution substantially the work of the candidate. Hitherto comparatively few accurate magnetic measurements on single crystals, particularly organic crystals, have been made. The important task of linking up of the magnetic characteristics with what is known of the crystal structures from X-ray work is possible only by comprehensive & painstaking investigations. In this work the magnetic axes & ^{the} susceptibilities along them of no less than 42 crystals have been determined. The investigation of each crystal is a research in itself, for elaborate care is necessary in the preparation & manipulation

of the specimens, & though the methods adopted in making the magnetic measurements are simple in principle, meticulous care in detail is necessary if reliable results are to be obtained. Check expts. were carried out, & evidence of reliability is provided by the general consistency of the results. In view of the quality of the work, the comprehensive character of the investigation adds greatly to its value. The presentation of the experimental work is excellent. The results are clearly set forth, & essential details & novel points of the methods are briefly, but adequately, described.

In discussing the significance of the results full use is made of relevant material available from X-ray analysis, & from investigations on magnetic birefringence. In cases where the arrangement of the molecules in the crystals is known, the magnetic results enable the magnetic constants for the different directions in the individual molecules to be found. Using the values so obtained, it is possible in other cases to determine the orientation of molecules in crystals where this is unknown. Apart from the value magnetic

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data are shown to have in contributing towards the determination of molecular arrangement in crystals, the results for the constants for molecules provide material which will be of the utmost value for the further development of magnetic theory in relation to molecular structure. The work described in this thesis is therefore a very substantial contribution to several branches of Physics.

The work of the candidate as a whole shows him to be an investigator of high quality, with marked & varied experimental skill & theoretical ability, continuously alert interest & power of sustained effort; while independence & originality are clearly manifest in his main individual work. I recommend unreservedly that the degree of D. Sc. be granted.

(Sd) Edmund C. Stoner

7th April 1933.

Report on Mr. K. S. Krishnan's Thesis.

A main & a supplementary Thesis have been submitted by the candidate. The supplementary thesis consists of a considerable number of papers, ten of which, published up to 1927, have already been submitted for the M. Sc. degree. It is of interest to note that these are in part concerned with topics, such as the magnetic double refraction of liquids, other aspects of which have been followed up in later work; they represent a high standard of work for the M. Sc. & need not be further considered here. The remainder of this part of the thesis contains some 12 papers & 10 brief communications published up to 1931. Most of these are concerned with the discovery & early work on the Raman effect (mainly experimental) which opened up a new & important field of physical investigation, & with the optical & magneto & electro-optical properties of liquids (mainly theoretical). Much of the work was carried out in collaboration with Prof. Raman, & no explicit indication is given as to the candidate's share, nor as to how far he was responsible for the lines of investigation. Making reasonable assumptions as to the nature of the collaboration, however, the papers give evidence at least of very considerable technical skill in optical work; of insight in grasping

Davy Faraday Research
Laboratory.

The Royal Institution
London

1st May 1933.

Mr. K.S. Krishnan's application for the D.Sc degree meets with the warm approval of the electors, Dr Stoner, Prof. Richardson & myself. We are all agreed that the work which he has done is notable both for its intrinsic value & for its indications of his great abilities & perseverance.

It will be seen from a consideration of the actual reports which I enclose, written by Dr Stoner & Prof. Richardson that both these gentlemen are very much impressed by the thesis submitted. I may say that I concur in their judgment, & therefore on behalf of the committee you appointed I beg to recommend that the degree be granted.

(sd) W.H. Bragg.

Director

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THE ROYAL INSTITUTION,
21, ALBEMARLE STREET,
LONDON, W.1.

11th November 1936.

Dear Krishnan,

We shall be very glad indeed to see you
at the Royal Institution in the spring of 1937.

Yours sincerely,

W H Bragg

Professor K.S. Krishnan,
210 Bowbazar Street,
Calcutta.