

**The Structure of Glass. Vol. 2.** English Translation of the Proceedings of the 3rd Russian conference on the Glassy State, Leningrad, November, 1959. (Consultants Bureau, New York, 1960). Pp. XII+480. Price \$25.00; vols. 1 and 2 \$40.00.

Three conferences have been held in Leningrad on the Glassy State, in 1939, 1953 and in 1959. An English translation was published of the 1953 conference (Consultants Bureau, New York, 1958) and now this English translation of the 1959 conference has also been made available.

The proceedings are divided into the following sections; General problems of the Glassy State, Silicate Melts and Mechanism of Glass Formation, Optical properties and structure, electrical properties, physicochemical properties and Vitreous systems of special character. The proceedings of this last section are most interesting.

In the section on 'General Problems of the Glassy State', eleven papers are concerned with the methods and results of glass structure studies, relationship of structure to properties and the nature of the chemical bond in glasses. Many of the contributions are rather general and no real advance in technique or theory can be claimed. Porai-Koshits discusses some interesting low-angle X-ray scattering observations from two-phase glasses and Myuller the nature of the chemical bonding.

The section on optical properties and the structure of glasses is concerned with infra-red studies and extensive experimental data are presented. An electron-diffraction study, using the rotating sector method, of lead silicate glasses is described by Bagdyk'yants and Alekseev when some computed diffraction curves of a simplified nature are compared with the experimental observations.

The contributions in the section devoted to 'Electrical Properties of Glasses' are mainly concerned with phenomenological detail. Myuller discusses the relation of electrical properties to glass composition and several papers discuss electrical properties of various complex industrial silicate glasses. Two studies of the diffusion of metal ions in silicate glasses are reported.

In the section on the physicochemical properties of glasses, studies are reported on the 'Colouration of glasses and action of Radiation', 'Mechanical and certain Technical properties of glasses', and the 'Chemical Properties of Glass'. The contributions are either of a very general nature or discuss the properties of complex industrial glasses. Two papers discuss the properties of glass fibres.

The section on 'Some Vitreous Systems of Special Character' is most rewarding. The semiconducting Chalcogenide glasses (solid solutions of  $As_2S_3$ ,  $As_2Se_3$  and other sulphides, selenides and tellurides) are discussed in a very interesting series of papers. The composition range of glass formation is discussed, the electrical properties, optical properties and structure, and these properties are compared with those of the crystal forms of the same composition. The electrical conductivity varies over extreme ranges, with high values of thermal e.m.f. and photoelectric effect. The five contributions present a well balanced account of the studies and are introduced by a short review by Kolomiets. A paper is also presented on the semiconducting properties of glasses based on  $V_2O_5-P_2O_5$  and  $V_2O_5-P_2O_5-BaO$ .

In the last section of the conference, the microporous glasses derived from sodium borosilicate are discussed

in some detail in nine papers. Various aspects of the relation of thermal history to microstructure are discussed.

It is, of course, not an easy matter to render Russian scientific text into clear English and whilst the translations are adequate, a knowledge of the subject matter is sometimes needed to interpret the English (see in particular article by Kolomiets, p. 403).

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**Crystal Structures.** By RALPH W. G. WYCKOFF. Supplement V. Interscience Publishers, Inc., New York 1960. Price \$26.50.

R. W. G. Wyckoff's great work *Crystal Structures* began publication in 1948 in small sections and loose leaf form, and for this reason only one of its larger sections has been reviewed in this journal (J. M. Robertson (1954), *Acta Cryst.* 7, 867). The present Supplement V and index 'completes' the work in the words of the Publisher's announcement. This event is to be compared to the opening of the span of a bridge on which work has long been going on. It provides an occasion to look at the whole structure.

The work is, indeed, one of art and science combined. Its aim: to provide a current survey of all crystal structures which the author considers to have been determined with reasonable certitude and accuracy. Each substance fully entered occurs in four places:

(1) In the 'text', where a general description is given including the cell dimensions, space group, positions occupied in terms of general parameters, and a short and usually very lucid explanation in words of the atomic coordination and general features of the structure.

(2) In the 'table', where the parameters of the positions and usually a code of reference to the bibliography section are to be found.

(3) On a page of 'illustrations'; here a 'packing drawing' of the structure is given which illustrates and amplifies the general description given under (1).

(4) On one of the bibliography pages, provided a code was given under (2).

The author's critical understanding shows up in the selection of the structures admitted to the collection, and in the formulation of the essential features of each structure both in the text and in the aspect chosen for the illustration. The illustrations themselves are works of art. Great skill is required in producing 'packing drawings' such as these: in spite of overlapping atoms, they remain transparent enough to show the arrangement inside the structure. These illustrations often give projections differing from those of the authors in the original paper and from those contained in *Structure Reports*. A comparative study of the different drawings sometimes leads to a better three-dimensional understanding—and quite often reveals a superiority in Wyckoff's rendering.

Thus it would be wrong to see in this work only a compilation; instead, this monumental collection of probably more than 5200 type-written pages, assembled