ritory in easy, readable fashion. The division of attention between the instruments themselves (five chapters) and applications to chemical and physical problems (six chapters) represents a nice balance. The author's enthusiasm for his subject matter is tempered by good judgment in both the selection of topics to be covered and the treatment accorded them. For example, the discussion of low-voltage spectra (p 231 ff) is brief and very good, defining clearly both the special strengths and the limitations of the technique. This book will serve well the needs of the student or professional worker with no previous experience in mass spectrometry. It will furnish him both an introduction to and survey of the entire field and guidance in exploring the literature for material relevant to his special interests and needs.

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Crystal Chemistry of Tetrahedral Structures. By ERWIN PARTHÉ, Department of Metallurgy and Laboratory of Research on the Structure of Matter, University of Pennsylvania. Gordon and Breach, 150 Fifth Ave., New York, N. Y. 1965. xii + 176 pp. 15.5 × 23.5 cm. $9.50.

This scholarly and well-produced monograph is concerned with the crystal chemistry of some 200 elemental, binary, ternary, and quaternary compounds, the structures of which are related to the two basic tetrahedral lattices: the cubic lattice of diamond (or of sphalerite) and the hexagonal lattice of the oxygen atoms of ice I (or of wurtzite). The principal theme is the classification into *normal structures*, in which every atom has four tetrahedrally coordinated nearest neighbors, *defect structures*, in which not all four corners of the surrounding tetrahedra are occupied, and *filled structures*, which contain additional atoms within the voids of the tetrahedral lattices. By means of an easily recognized shorthand notation specifying stoichiometry and valence, and an electron-counting formula called valence electron concentration, VEC, the author is able to encompass within a consistent scheme many of the structural types found in those combinations of elements which tend to be symmetrically disposed with respect to the lower center of the periodic table. These compounds are intermediate in their electronic structures between the metals and the insulators, and, for this reason, it is of considerable technical importance to have their known or probable compositions and structures related in this orderly way. Parthé's approach is essentially that of descriptive stoichiometry and geometry, but he uses these concepts critically. For example, he says of the mineral germanite, "Cu_3GeS_4 supposedly crystallizes with a normal adamantine structure. With a VEC = 3.86, this is impossible. Either the true composition is Cu_2GeS_3, perhaps Cu_2FeGeS_4, or the structure is different." This approach is most useful for evaluating old compounds and preparing new ones.

The monograph is a classical example of the application of crystal chemistry to the structural data of a related group of compounds. As such, it is a necessary prerequisite to the much more difficult questions concerning which structures are thermodynamically the more stable at different temperature and pressures. Why, for example, of the 245$_2$ compounds, is $BeSiN_2$ related to wurtzite, while $MgGeP_2$ is related to zinc-blende; or for that matter, why is cubic ice stable only at around −130°C and hexagonal diamond is not found? As Parthé says in his last sentence "here lies the challenge for the solid state physicist (or the quantum chemist) to develop accurate bonding mechanisms which ultimately must result in valence electron rules identical to those demonstrated in this crystal chemical study."

The author and publishers are to be commended upon producing a book which is exceptional in the accuracy and detail with which it covers the limited field of its subject matter. It should be useful both as a reliable reference and as a source of authoritative material for teaching crystal chemistry.

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