

Book Review

F. Liebau: *Structural Chemistry of Silicates: Structure, Bonding and Classification*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1985.

The first three chapters of this text (50 pages) are introductory: the abundance and diversity of silicon compounds is first made clear and then some coverage is given to the methodology of describing structures and bonding in silicates. The coverage is wide-ranging and excellent, with only one or two very minor points of contention, e.g. on p. 27 the possibility of distinguishing static from dynamic disorder with low temperature studies has been omitted, and the hybrid orbital concepts on pages 35–42 would not find favour with photoelectron spectroscopists.

Chapters 4 to 7 contain the meat of the book. They deal with the structural and crystal chemical classification of silicates that Professor Liebau has built up over the years. This section gives the reader a methodology for approaching the description of particular structures. Useful concepts covered include: coordination number, linkedness (corner, edge of face sharing), connectedness (number of polyhedra to which a particular tetrahedron is linked), branchedness (open branched, loop branched etc.), multiplicity (number of single anions connected to form a multiple anion), periodicity and dimensionality. Examples are given to explain the application of the procedure in particular cases.

After a return to earlier classification methods, which includes a general classification of tectosilicates of obvious use to those engaged in zeolite chemistry, Professor Liebau sets out the general rules for silicate anion topology, echoing the historic work of Pauling. This is followed by a chapter on the influence of cation properties on the shape of silicate anions, a portion of the book which is incredibly wide ranging and a vast amount of data are presented in a clear fashion. The corrugations in layer silicates, strain reduction mechanics in cation rich systems and the effect of template molecules in clathrasil formation are just a few examples of the material covered.

Professor Liebau's concluding remark is that "the hardness of men's hearts makes an idol of classification, but a knowing heart will use it as an aid". This, I think, is the spirit in which the book should be read. Few silicate chemists will probably use Liebau's classification rigorously in attempting to unambiguously assign a particular silicate to one structural class, yet the book is a genuine *tour-de-force*, full of facts and good sense. It has, incidentally, superb diagrams and the reproduction of micrographs is excellent. No silicate scientist should be without his own copy.

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