

## book reviews

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**Crystallography of Modular Materials. Vol. 15, IUCr Monographs on Crystallography.** By G. Ferraris, E. Makovicky and S. Merlino. Oxford University Press, 2008. Price (paperback) GBP 39.95. ISBN 978-0-19-954569-8.

This is a valuable book. The authors try to unify the underlying principles of a wide variety of complex structures consisting of simpler building blocks (*i.e.* moduli, mostly two of them). These blocks may fit in a large common cell or, in the case of alternating layers, may keep their own smaller cells without a common cell at all like for koenenite or tochilinite (misfit layer structures, a well coined term which I missed in the book).

The task of this book was a difficult one, because numerous authors have handled special aspects of this rapidly expanding field using their own nomenclature. This book is the first one which offers a unified treatment of modular structures.

In the first chapter (126 pages) modular series like the Pb–Bi–Ag sulfosalts or the humite homologous series are handled. It also contains non-commensurate examples like the cylindrite-franckeite family. The scope of chapter 2 (80 pages) is the order–disorder (OD) structures. In OD structures one or more type of building blocks (*e.g.* layers) are stacked by chance using a few well defined stacking possibilities and therefore such structures are non-periodic at least in one direction. For instance, in a hexagonal close-packed structure

an *A* layer at  $x, y = 0, 0$  may be followed by a *B* layer at  $\frac{1}{3}, \frac{2}{3}$  as well as by a *C* layer at  $\frac{2}{3}, \frac{1}{3}$ . In some cases a complex stacking sequence of up to 100 and more layers may become periodic, as for numerous ZnS and CdI<sub>2</sub> polytypes. However, these structures are completely missing in the book as well as their concise description by the Zhdanov symbol.

Chapter 3 (20 pages) is devoted to polytypes and polytype categories. Chapter 4 (53 pages) handles the application of modularity to structure description and modelling. In the last chapter (29 pages) the principle of cell twinning is explained, which allows new structures to form out of simpler ones, as for instance in the perovskite family.

As the concept of modularity is handled in numerous papers, which may even use different nomenclatures, the list of references (54 pages) contains about 800 references, mostly from the last 40 years.

The book is recommended to all crystallographers dealing with complicated inorganic structures as well as to students entering this field of interest. It is a must for all crystallographic libraries.

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