

try courses with an emphasis on thermodynamics and intended for graduate or senior undergraduate students. Researchers in petrologically oriented fields will also find the book useful.

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*AN ATLAS OF HYPERSTEREOGRAMS OF THE FOUR-DIMENSIONAL CRYSTAL CLASSES.* By E.J.W. Whittaker (1985). Published by Clarendon Press, Oxford, U.K. 200 pages. Price: C \$81.25.

The theory of four-dimensional crystal symmetry, an obscure concept, has a practical application in the interpretation of modulated crystal-structures, like those of plagioclase and antigorite. The text uses a geometrical approach with limited matrix-algebra to represent the four-dimensional crystal classes rather than the analytical group-theory used by other authors. After dealing with one-, two-, and three-

dimensional space, the problem of dealing with four-dimensional space and symmetry, although abstract, is treated by analogy. New symbols are derived for the additional 14 symmetry elements and the 227 four-dimensional crystal classes, of which 44 are enantiomorphic. The crystal classes are discussed in the order of the 23 crystal families, where some families are subdivided to give 33 crystal systems. The geometrical representation is by the use of stereopair drawings, where four-dimensional space may be shown.

The text is short, concise and accurate. The information is developed in a logical manner. The book is well produced with large, clean type. Although the size of the stereopair diagrams is excellent for the crystal classes of low symmetry, the same size makes the interpretation of crystal classes with high symmetry difficult.

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