to appear blue – green to grey against cuprite is difficult to recommend.

R. A. IXER

Ghose, S., Coey, J. M. D. and Salje, E., eds. *Structural and Magnetic Phase Transitions in Minerals*, (Advances in Physical Geochemistry, volume 7). Springer-Verlag, Berlin, Heidelberg & New York (Springer-Verlag), 1989. xii + 244 pp. Price DM 108.00.

The seventh volume of the Springer series on 'Advances in Physical Geochemistry', maintains the high standards set by the previous volumes. In this text, the editors have gathered together contributions which attempt to give an impression of the range and sophistication of current mineralogical research on phase transformations. Although many non-specialists may not be familiar with the ideas now central to contemporary research on phase transformations, such as Landau theory or molecular dynamics, the authors of the various chapters in this book have generally attempted to provide a broad introduction to their contribution, in which the key concepts used in their analyses are introduced and qualitatively explained.

The book is divided into twelve chapters, which address a variety of topics. Some chapters provide new insights into 'classic' mineralogical problems, such as the nature of phase transformations in the plagioclase feldspars, while others, which are equally fascinating to the research worker committed to the study of phase transitions, may be considered somewhat esoteric by the more general mineralogist.

Chapters 1 and 2 (by Salje and Dolino, respectively) show how Landau theory, when combined with careful diffraction experiments, can be used to interpret the phase transformations both in plagioclase feldspars, and in quartz and its isostructural analogue berlinite. Davidson, in Chapter 3, uses more classical thermodynamics to model miscibility gaps in the pyroxene quadrilateral, while Burton and Davidson in the following chapter show how the Bragg-Williams model and more sophisticated cluster variation methods can be used to simulate a variety of complex, subsolidus phase diagrams.

Research into minerals, or hypothetical minerals, that are stable only at very high pressures is outlined in chapters 5 to 7. Bukowinski and Wolf describe how their computer simulations of magnesium silicate perovskite can be used to obtain estimates of the equation of state of this major Earth-forming phase, and discuss the resulting geophysical implications. The effect of pressure on the spin state of iron (II) is addressed in chapter 6 by Sherman, while Matsui and Matsui outline their recent molecular dynamics simulation of the high-pressure SiO_2 polymorphs, and predict the existence at very high pressures of a cubic polymorph, related to pyrite structure.

The role of electrons in mineral phase transformations are discussed in chapters 8 to 11, which concentrate on magnetic phase transitions in silicates. Chapter 9 by Coey and Ghose, provides a particularly useful review on this subject. Finally, Salje and co-workers provide a chapter on polytypism, and present results of experiments on PbI_2, which they attempt to interpret in terms of theoretical models for polytypism, such as the ANNNI model.

Each of the chapters in this book is of the highest standard, and cannot be faulted. The book, however, is more akin to a 'Special Issue' of a journal, such as Mineralogical Magazine or Physics and Chemistry of Minerals, than to a comprehensive text on the subject of Phase Transformations. As such, despite the clearly written text, I imagine few general mineralogists will be tempted to buy this book, however I hope they may find it on the shelves of most institutional libraries, and I urge them at least to peruse this volume during a leisured visit to their local mineralogical library.

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