

BOOK REVIEW

Microporous and Mesoporous Mineral Phases, edited by G. Ferraris and S. Merlino. Mineralogical Society of America and the Geochemical Society, in partnership with Accademia Nazionale dei Lincei – *Reviews in Mineralogy and Geochemistry*, 57, 2005, 448 pp. [ISBN 093995069-3]. Price \$40 (25% discount for members).

The most recent volume in this well known series is the result of a meeting held in Rome, in December, 2004. The aim of this meeting was to obtain a better understanding of the crystal-chemical and structural properties of naturally occurring minerals that can then be applied to synthetic materials. A classic example of this type of synergy can be found in the development of the synthetic zeolites. Twelve of the oral papers from this meeting have resulted in the latest in the 'Reviews in Mineralogy and Geochemistry' series.

From the perspective of a journal like *Clays and Clay Minerals*, not all chapters are relevant but by no means does that mean that they are less interesting. Chapter 1 by McCusker is an introduction to the IUPAC nomenclature for ordered microporous and mesoporous materials, of interest to anybody working with porous materials, whether it is with zeolites, pillared clays, MCMs, etc. In Chapter 3, Ferraris and Gula briefly discuss sepiolite, palygorskite and related structures such as kalifersite, an intermediate between sepiolite and palygorskite, and the related titaniasilicates, raite and intersilite, all three found in the hydrothermally altered pegmatite at Mount Kukisvumchorr (Kola Peninsula, Russia). A brief paragraph introduces the concept of absorption of organic molecules in these structures. Chapter 12 by Mellini briefly discusses the mesopores present in chrysotile.

Chapter 4 (Chukanov and Pekov) introduces the concept of microporous heterosilicates. This group differs from the classic zeolites in the sense that they contain transition elements (such as Ti, Nb, Zr, Fe, Mn, Zn, Ta, Sn, W) in their framework. More than 100 mineral species are considered to belong to this class of silicates, e.g. members of the eudialyte, lovozerite and hilairite groups. In contrast, Chapter 5 (Pekov and

Chukanov) deals with the microporous framework silicates containing rare and transition elements. In Chapter 6, Rocha and Lin describe microporous mixed octahedral-pentahedral-tetrahedral framework silicates. A detailed description is given of a number of titano-, zircono-, vanado-, niobo-, stanno-, indo- and rare earth-silicates. Not only the structures are given but the synthesis methods for many of these compounds are also discussed critically. The end of the chapter provides a short introduction into the catalytic and sorption properties of some of these materials.

Chapters 7 (Depmeier) and 8 (Bonaccorsi and Merlino) deal with the sodalite framework structures and the modulated structures of the cancrinite-davyne group. For some, the sodalite cage structure is the archetypical structure of a zeolite, though others exclude sodalite from the zeolite group *sensu stricto*. In contrast, minerals in the cancrinite group are considered to be feldspathoids. Minerals in the cancrinite-davyne group differ mainly with regard to the extra-framework anions present such as chloride, carbonate, sulphate, etc.

Overall, this book is an interesting addition to the existing literature on microporous and mesoporous materials such as zeolites, pillared clays, MCMs, etc., especially the *Handbook of Zeolite Science* and *Handbook of Layered Materials* published in recent years. In comparison to those titles, the \$40 price tag here represents good value for money.

REFERENCE

- Auerbach, S.M., Carrado, K.A. and Dutta, P.K. (2003) *Handbook of Zeolite Science and Technology*. Marcel Dekker Inc, New York, 1184 pp.
Auerbach, S.M., Carrado, K.A. and Dutta, P.K. (2004) *Handbook of Layered Materials*. Marcel Dekker Inc., New York, 646 pp.

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