

BOOK REVIEWS

X-ray analysis of rock-forming minerals (layer and framework silicates) Edited by W. A. Frank-Kamenetsky, Niedra, Leningrad, 1983

The development of geological prospecting largely based on mineralogical methods justifies the growing importance of X-ray investigations. Nowadays, X-ray analysis is not limited to phase analysis but has a more complex character, being used for the crystallochemical characterization of minerals, the determination of structural admixtures, structural ordering and defects, and their relation to the geological environment of formation. It may be used in equal measure to control the quality of raw materials and to help geological prospecting. In relation to the development of genetic mineralogy, and especially its important branch — structural typomorphism, X-ray investigations overstep simple diagnosis and pass into real structural determination. The crystallochemical peculiarities of the specific rock-forming minerals groups additionally emphasize the need for individualization of X-ray methods to adjust them better to the character of the minerals studied. Therefore, after the publication of the *Handbook of X-ray analysis of minerals* in 1975, the same editor, prof. W. A. Frank-Kamenetsky, prepared a book on X-ray diffraction studies of micas, clay minerals and feldspars, all of them widespread in nature.

The book contains three separate chapters prepared by different authors: 1. *Mica group* by Rozhdestvenskaya, Semenova, 2. *Dispersion layer silicates (clay minerals)* by Viakhirev, Diakonov, Krinari, Kotelnikova, Volkova, Vlasov, Sakharov, Frank-Kamenetsky, 3. *Feldspars* by Kamentsev, Smetanykova. Each chapter gives up-to-date information on the structure, crystal chemistry, powder methods, sometimes single-crystal methods, and on the environments of formation of minerals in question. The respective chapters are illustrated with powder patterns and diagrams of diagnostic relationships, and are furnished with references.

One half of the first chapter is devoted to the crystal chemistry of micas. It gives data on real structures, together with figures illustrating their dependence on chemical composition. The ordering and polytypism of micas are also discussed. The second half of the chapter presents powder, and to a lesser extent, single-crystal X-ray methods for the study of micas.

The second chapter discusses methods for the study of highly dispersive polycrystalline minerals, using different types of X-ray aggregates and techniques, such

as oblique texture X-ray diffraction. Next, crystall chemistry is described, along with the methods for the study of various groups of minerals, for example kaolinite, smectite, vermiculite, glauconite and several mixed-layer species.

The third chapter deals with the ordering of the Si—Al isomorphic substitutions and with the methods of investigation of K—Na feldspars and plagioclases. It presents experimental material concerning the phase composition, unit cell parameters and isomorphic substitution, as well as diagrams showing the relationship between the structure and composition. The correlation of structural and environmental parameters is used to characterize the typomorphism of feldspars.

The book presents a very interesting, modern, unconventional approach to the specific methodological problems related to the determination of structural parameters of rock-forming minerals belonging to such important groups as micas, clay minerals and feldspars. It provides up-to-date information on the specific structural features of these minerals and on the selection of X-ray methods best adapted for their studies. Although it is easy to predict that the data from structural refinements in the near future, will accumulate, the book will still be of great use to mineralogists geochemists, petrologists and other investigators dealing with raw materials.

Andrzej Wiewióra

KABATA-PENDIAS A., PENDIAS H.: Trace Elements in Soils and Plants. CRC Press, Inc., Boca Raton, Florida 1984, 315 pages, 71 figures, 160 tables, 942 references, subject index, list of units, symbols abbreviations, and appendix with common plant names and corresponding Latin names.

This book aims review the knowlege of geochemical and biochemical processes which directly or indirectly influence the distribution of trace elements in soils and plants in both natural and contaminated ecosystems. Current data concerning above 60 trace elements are presented, based on information obtained from authentic and recognized sources of recent references from many countries.

The first five chapters of the book are devoted to general processes in soils and plants that govern natural cycling of trace elements in the soil-plant system. New insights into relationships are provided with emphasis on chemical speciation of trace elements in soil environments, and their bioavailability. The interactions of trace elements with major elements, soil minerals, organic matter and soil microbiota are also discussed in detail.

The following eight chapters deal with the occurrence, species, and fates of trace elements in soils and plants. In addition, common values of concentrations of these elements are given for the main types of magmatic and sedimentary rocks. The trace elements are discussed in the sequence of chemical periodicity, which allows a clear understanding of the chemistry and biochemistry that influence their behavioral properties. The impact of technogenic factors on concentrations of the trace elements in soils and plants is presented.

This publication of the Uni-Science Series of CRC Press fills up the gap between geochemistry and environmental sciences. The book would be of special interest to geochemists, biochemists, soil scientists and botanists.