

BOOK REVIEWS

STUCKI J.W. & BANWART W.L. *Advanced Chemical Methods for Soil and Clay Minerals Research*. D. Reidel, Dordrecht, London and Boston, 1980. vii+477 pp. Price Dfl. 110 US\$58.00.

This book derives from the NATO Advanced Study Institute held at the University of Illinois in July/August 1979 and is intended to introduce research workers in the soil and clay mineral areas to new techniques.

The book opens with a comprehensive and generally well-balanced account, by Goodman, of the application of Mössbauer spectroscopy. The wide range of examples given all relate to ^{57}Fe and practical aspects are particularly well covered. There follows a chapter on neutron scattering, by Ross and Hall, which expounds the theory and practice of this wide-ranging technique in a particularly comprehensive fashion. The introductory chapter on X-ray photoelectron spectroscopy (XPS by Defosse and Rouxhet) is, however, less recommendable. Most of the topics one would hope to see in such a context are indeed included and are discussed at the right length, but unfortunately misleading statements abound relating to *inter alia* the definition of binding energy, Koopmans' theorem, spin-orbit splitting, the origin of line widths, sensitivity factors, etc. Generally, however, the errors are not such as would affect the purely pragmatic use of the technique in mineral chemistry and many readers may still find the account helpful when read in conjunction with a reliable account of the underlying theory. The following chapter by Koppelman on the application of XPS to the study of mineral surface chemistry is very comprehensive and valuable on that account but is rather uncritical of the literature. We then move to NMR. A general and introductory piece by Fripiat concentrates on the molecular motion of interlayer water and then we have a splendid account of the application of the technique to the problem of distributions of ions in the octahedral sheet of micas using multinuclear NMR (Stone and Sanz). The treatment of ESR follows the pattern set above with an introductory chapter by Vedrine containing only a few examples with a mineralogical flavour: the following chapter by Pinnavaia is extremely clear and well written with a multitude of diagrams and examples, all of which are in the clay mineral area. The application of spin probes to ESR studies of clay/organic systems is then described by McBride. The relevance of this technique is not set out early enough in the chapter. The concluding chapter by Schmidt on photoacoustic spectroscopy is extremely interesting and points to a bright future for this new technique.

The presentation of the book is spoiled somewhat by poor reproduction of diagrams (of many different styles) and by numerous small (and not so small) errors sprinkled throughout the text. Despite these reservations, we can recommend the book as an extremely valuable introduction in each of the areas covered. It should be essential reading for any one involved with clay minerals.

J. M. ADAMS AND S. EVANS