

Sears, D.W.G. (1988c) Chemistry of the Solar System: An Introduction to Cosmochemistry, by H.E. Suess. *Surveys in Geophysics* **10**, 91-92. (Book review).

H. E. Suess, *Chemistry of the Solar System: An Elementary Introduction to Cosmochemistry*, John Wiley, 1987. ISBN 0-471-83107-7. £24.20. pp. xi + 143.

The application of the principles of chemistry to problems of the cosmos provides uniquely attractive subject matter for a serious undergraduate lecture course. Understanding current theories for the synthesis of the elements, the formation of interstellar molecules, and the isotopic and elemental abundances in meteorites (and planets) requires a firm understanding of some of the most fundamental principles in nuclear, physical, analytical and geo-chemistry. There is, however, an unfilled niche for an introductory text on cosmochemistry, and there can be few people better qualified than Hans Suess to take on the task. Suess retired in 1985 after a long and distinguished career in cosmochemistry and, he tells us in the introduction, the present book is the result of teaching a cosmochemistry course to undergraduates for 17 years.

The book is divided into two parts, one which summarises some relevant nuclear chemistry (decay mechanisms, the Liquid Drop Model, odd-even effects, magic numbers, and isotopic and elemental abundance curves) and a second part dealing with isotopic anomalies in meteorites, equilibrium condensation of solids in the primordial nebula, meteorite classification, and the planets. The idea is that the second part applies the principles covered in the first part.

The overall structure is one of many attractive features of the book; the level is about right, the treatment of the basics of nuclear chemistry is thorough and quantitative and the writing friendly and authoritative. The treatment follows the historical development of the subject, so the facts unfold in a fascinating and absorbing way. There are also sections on condensation in the solar nebula and rare gases in meteorites which are very clear accounts of highly complex issues; there is nothing comparable for the intended readership.

Unfortunately, the book also has several negative features. Large sections of the book are 20-30 years out of date; for example, those on meteorite classification and models for the formation of the solar system. For meteorite classification, at least, this may not be too much of a problem as the underlying chemical principles still shine through. More than 50% of the references are pre-1950 and one table of estimates for the metal content of the bulk Earth contains six references with dates between 1930 and 1952. There is also a problem with the author's use of obsolete databases; for example, the 1960 version of JANAF is used for thermodynamic data and the Prior-Hey 1953 catalogue of meteorites is used for meteorite statistics. Both have been superseded many times and developments have been major. A final negative point, probably the publisher's responsibility, is the very poor paper quality, which means that resolution does not match the demands of some of the highly elaborate plots.

It is good to see a book appear which attempts to treat cosmochemistry in a substantial way that could genuinely contribute to the education of bright undergraduate students. Hopefully, the problems will be taken care of in a second edition.

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