

Book review

Gmelin handbook of inorganic chemistry, 8th Edition. *Sc, Y, La–Lu–Rare Earth Elements. Volume A8: Y, La and the Lanthanoids: Minerals (Silicates). Deposits. Mineral Index*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1984, xv + 413 pages, DM1391. ISBN 3-540-93505-3.

This is the twenty-sixth volume of the Gmelin Handbook dealing with the chemistry of “Scandium, Yttrium and the Rare Earth Elements” (System No. 39) to appear since the main volume was published in 1938, and the twelfth to be published since 1980. This is a measure of the importance which the Gmelin Institute places in this fascinating group of elements, singularly named in that they are neither rare nor earths (metal oxides which are difficult to reduce). Indeed, as well as devoting 278 pages to the occurrence and paragenesis, the crystal forms and crystal structures, and the physical properties and chemical behaviour of each of the many silicate minerals of these elements (n.b. the non-silicate minerals were discussed in Volume A7), this volume also describes the genetic types of rare earth mineralisations, the relationship between the genetic type of rare earth mineralisation and geochemical or geological conditions of ore formation, classification of rare earth deposits, prospecting, the economical valuation and technology of rare earth elements (including a list of suppliers and an assessment of the reserves, production and consumption of rare earth elements and compounds by countries — 95% of the total world output is produced by six countries: USA, Australia, India, Malaysia, USSR and Brazil) and the regional distribution of rare earth deposits and occurrences. Finally, the volume contains an invaluable alphabetic mineral index covering both volumes A7 and A8.

The applications of the rare earth elements include the fields of metallurgy, ceramics, illumination (including carbon arcs, lasers, phosphors, fluorescent and mercury vapour lamps, and colour television sets), nuclear fission, glasses, electronics, catalysis, pharmaceuticals, photography, analysis, lubrication, chemical processing and thermometers. In 1980, the single largest use (35% of the world's consumption) of rare earth oxides was as catalysts and chemicals, and this is reflected in the rapidly growing area of lanthanide organometallic and coordination chemistry (*Inorganica Chimica Acta* recognises this by now devoting one of its three Sections to the *f*-block elements). Although this volume is of no direct relevance to organometallic chemists, it is to be welcomed as a necessary part of the one truly comprehensive work upon the rare earth elements. The volume meets the normal high standards set by the Gmelin Institute, and the authors (I. Kubach and W. Topper) are to be congratulated upon completing their mammoth task, and for providing a learned and lucid discourse upon their subject. The literature covered has a closing date of 1982, and extensive use is made of tabulated material.