

Book reviews

Gmelin handbook of inorganic chemistry, 8th Edition, *Th — Thorium*, Supplement Volume D2: *Solvent Extraction*, Springer Verlag, Berlin, Heidelberg, New York, Tokyo, 1985, xiv + 260 pages, DM 987, ISBN 3-540-93520-7.

This is the fifth volume which the Gmelin Institute has published concerning the chemistry of thorium (System No. 44): the main volume was published in 1955, Supplement Volume C1 (1978) described the compounds of thorium with the noble gases, hydrogen and oxygen, Supplement Volume C2 (1976) covered the ternary and polynary oxides of thorium, and Supplement Volume E (1985) was dedicated to thorium coordination and organometallic compounds. Part D (as for uranium) has been assigned to the solution chemistry of thorium, and the current volume (D2) is devoted to solvent extraction. This is, of course, of fundamental importance to the nuclear industry for the extraction and recovery of nontransformed thorium from Thorium High Temperature Reactors by the THOREX process, and also for the separation of thorium from minerals and its final purification. Both of these processes most commonly use tributylphosphate, Bu_3PO , and much of this volume is concerned with the chemistry of the trialkylphosphates. Other commonly investigated extractants include bis(2-ethylhexyl)phosphate, amines, ammonium salts, and 1-(2-thienyl)-4,4,4-trifluoro-1,3-butanedione.

Unusually for the Gmelin Handbook, this volume has been written by only one author (Z. Kolarik), whose lucid style reveals his expertise in the field. Indeed, this volume has been written by and for those experienced in the art of solvent extraction, and this is reflected by the titles of the sections: Introduction (including scope, general literature, organization and nomenclature), Extraction of thorium by solvation, Extraction of thorium by complex formation with acidic extractants, Extraction of thorium by ion pair formation, and Less common extraction systems (including molten salts and molten metals). This is simultaneously the strength and weakness of the volume. Its arrangement is very much according to extraction method, and it is very difficult to find information with respect to a specific extractant. It would have been so much more useful if a ligand (extractant) formula index had been included (n.b. in Supplement Volume E, a fifty-three page index of this type was included, and this greatly enhanced the value of the book). The strong relationship between coordination chemistry and solvent extraction is camouflaged by this omission, to the detriment of both the volume and the subject. I would hope that the Gmelin Institute will seriously consider issuing an addendum to this Supplement containing such an index, as its value is incontrovertible, and its omission is a classic case of losing a ship for a ha'p'orth of tar.