

Gmelin handbook of inorganic chemistry, 8th edition, *U — Uranium, Supplement Volume C12: Uranium Carbides*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1987, xviii + 279 pages, DM 1202. ISBN 3-540-93539-8.

This is the twenty-sixth volume which the Gmelin Institute has published concerning the chemistry of uranium (System No. 55), and is the thirteenth of fourteen to deal with uranium compounds (we now only await Supplement Volume C6, which will describe the chemical properties of UO_2 , to complete this series).

This volume (C12) is concerned exclusively with compounds between uranium and carbon, and just over half of the volume (142 pages) is devoted to the binary uranium carbides (UC , U_2C_3 , and UC_2) and the phase relations in the U–C system. The second section (75 pages) deals with ternary and polynary carbides of uranium with other metals (particularly with the lanthanides, other actinides, and the metals of Groups 4–10), the third section (11 lines) describes the U–C–H system, and the fourth section details the uranium carbide oxides (14 pages). The final sections describe the uranium carbide nitrides (32 pages), the uranium carbide nitride oxides (4 pages), and the ternary and polynary carbides of uranium with other non-metals (14 pages). It is worth noting, however, that the fabrication of uranium carbides, and their irradiation behaviour, are described in Supplement Volumes A3 and A4.

The binary carbide UC and the ternary carbides $(\text{U}_{0.8}\text{Pu}_{0.2})\text{C}$ and $(\text{U}_{0.3}\text{Pu}_{0.7})\text{C}$ are of especial importance due to their potential and actual uses as fuels for advanced 'fast breeder' reactors, whereas UC_2 and $(\text{U}_{0.8}\text{Th}_{0.2})\text{C}_2$ are relevant for high temperature reactors. Owing to a plethora of reports on poorly characterized materials, the authors (H. Holleck and H. Kleykamp) have been highly critical in their selection of material for inclusion: it is an invaluable feature of this volume that so many of the references are to non-standard sources, often of difficult availability. It is a pleasure to read a volume such as this, in which the text is so obviously written by established experts in the field, and this volume will clearly remain the definitive text for many years. The volume is a model of quality production, and impressive use is made of clear and relevant figures (246, in total). However, although an important part of the set of volumes describing the compounds of uranium, this volume is of limited interest to the organometallic chemist. Nevertheless, it is clearly a volume which must be acquired by all libraries attached to atomic research establishments.

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