deals with the preparation and transformations of conjugated, non-benzenoid carbocyclic systems which conform to the Hückel $4n + 2$ π-electron rule. Annulenes were discussed in Volume V, part 1d, whilst Volume IV, part 3 considered delocalised cyclopropene based systems, but there is little overlap with earlier volumes of the modern editions.

The volume is divided into three main sections, the first of which deals with charged aromatic species, considering in detail the cyclopropenyl cation, radical and anion, cyclopentadienyl anion, tropylium salts, cyclooctatetraenyl dianion and cyclononatetraenyl anion. The anions are generally considered as free species, though experience suggests that many of them could be classed as organometallic compounds, with considerable association in solution. Curiously, the anions receive much less attention than the cations. Transition metal η^6-tropylium complexes are considered rather briefly.

The second section deals with condensed non-benzenoid aromatic compounds, with pentalene, indacene, azulene, heptalene, pleiadiene and their derivatives being the most important species discussed. That most of the material refers to azulene and its derivatives reflects the balance of the literature published in this area. The final and longest section is somewhat more diverse, discussing molecules which may be considered to have some aromatic character by virtue of a polar resonance form. The most readily familiar are cyclopropenone, tropone, and tropolene, but thiones, imines and fulvenes are also treated in detail. Pentafulvene and its derivatives merit extensive coverage, including a number of syntheses using metallocenes as precursors.

The interest of this volume for the organometallic chemist is considerable, if somewhat specific. Many of the anionic species should properly be considered as organometallics, although it must be noted that there is little structural information relevant to this point in the text. Secondly, many of the species discussed are ligands which form a wide variety of important metal π-complexes. Hence a comprehensive and detailed account of their synthesis is extremely valuable.

As with all the volumes of the Houben–Weyl series, the production of this work is excellent. The text is well illustrated, making the material readily accessible even to the non German speaker. There are more than 4000 references running well into 1984, a general bibliography and a detailed index. It is noteworthy that material from numerous dissertations has been included, since many of these data have not been previously generally accessible. The price of this series is now so high that its purchase is within the budget of only the most affluent of libraries, but it remains an indispensible reference work.

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Gmelin handbook of inorganic chemistry 8th edition, *U – Uranium, Supplement Volume C5: Uranium Dioxide, UO_2. Physical Properties. Electrochemical Behaviour*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1986, xv + 317 pages, DM 1209. ISBN 3-540-93524-X.

This is the twenty-fifth volume which the Gmelin Institute has published concerning the chemistry of uranium (System No. 55) to appear since the main volume was published in 1936: it is the second of three to describe uranium(IV) oxide. The first (Supplement Volume C4; 1984) described the production, preparation and crystallographic properties of UO_2, whilst the third (Supplement Volume C6) will describe its chemical properties: the volume under consideration here (Supplement Volume C5) describes its physical properties and electrochemical behaviour. Specifically, this volume details the following properties of UO_2: density, thermal expansion, elastic properties, hardness, creep, plastic behaviour, volume changes under irradiation, phase relations and thermodynamic functions, transport phenomena (including self-diffusion and thermal conductivity), dielectric constant, electrical conductivity, the Hall effect, and magnetic susceptibility. Perhaps of more interest to the inorganic chemist, this book also discusses the electronic structure of UO_2, and studies of it by electronic spectroscopy (both transmission and reflectance) and photoelectron spectroscopy, the vibrational spectra of UO_2, the properties of the $[UO_2]$ molecule and the $[UO_2]^+$ ion, and the use of spectroscopy to determine and interpret the non-stoicheiometry of UO_{2+x}. Finally, the electrochemical behaviour of UO_2 is discussed in terms of potentials, electrokinetic phenomena, the properties of UO_2 anodes, electrolysis of UO_2 melts, polarography in melts, and electrodeposition.

The importance of UO_2 to nuclear technology (it is the fuel for all light and heavy water reactors, and is used in a mixed crystal with PuO_2 in fast breeder reactors) cannot be overstated, and it is not surprising that this single compound is the subject of three complete volumes of the Gmelin Handbook. It is clear that the prime users of this particular volume are envisaged as nuclear engineers, but the authors (V. Haase, H. Keller-Rudek, L. Manes, B. Schultz, G. Schumacher, D. Vollath and H. Zimmerman) are to be congratulated for making the text so readable by chemists. Indeed, the sections concerned with electronic structure and electrochemistry deal with mainstream inorganic chemistry. It is taken for granted that the volumes produced by the Gmelin Institute are models of excellent production, being pleasingly type-set and clearly illustrated, and this volume is no exception. This book, taken with its two companion volumes, is now clearly the definitive source for all data related to uranium(IV) oxide.

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Ab Initio Molecular Orbital Theory; by W.J. Hehre, L. Random, P.v. R. Schleyer and J.A. Pople, London, Wiley, 548 pages, £81.80, ISBN 0-421-812-412

This is an eagerly awaited book by members of one of the most active and influential groups in quantum chemistry. Over a period of nearly twenty years they have established some widely accepted techniques, have written and distributed computer programs to carry them out, and have applied these techniques to a very wide range of chemical problems. Perhaps the work of the group is most commonly associated with organic molecules, and indeed these occupy a large part of this book. However, the standard ab-initio method is equally applicable to molecules