Journal of Organometallic Chemistry, 327 (1987) C57
Elsevier Sequoia S.A., Lausanne – Printed in The Netherlands

Book review

Gmelin handbook of inorganic chemistry, 8th Edition, *F — Fluorine, Supplement Volume 4: Compounds with Oxygen and Nitrogen*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1986, xviii + 409 pages, DM 1684. ISBN 3-540-93536-3.

It is surprising that, although ten volumes of the Gmelin Handbook have appeared dealing with perfluorohalogenated organic compounds of the main group elements, there have only been five volumes (including the volume under review) describing the inorganic chemistry of fluorine (System Number 5). The main volume was published in 1926, with a supplement in 1959. Since then, only two other volumes have appeared: Supplement Volume 2 (1980), describing elementary fluorine, and Supplement Volume 3 (1982) describing the compounds of fluorine with hydrogen. The current volume, however, enters the real world of fluorine chemistry, updating the 1959 volume and describing in detail the chemistry of the compounds of fluorine with oxygen and nitrogen. The compounds of oxygen described include OF_4, OF_3, OF_2, $[OF_2]^+$, $[F_2OOF]^+$, $[OOF_3]^+$, [OF]·, $[OF]^+$, $[OF]^-$, $[OF]^{2-}$, O_2F_2, O_3F_2, $[O_2F]$·, $[O_2F]^+$, O_4F_2, O_5F_2, O_6F_2, $[O_3F]$·, $[O_4F]$·, HeOF, $[HOF_2]^+$, HOF, FHO, HFO, $[HOF]^+$, $[HOF]^-$, $[HFO]^+$, $[HFO]^-$ and HO_nF ($n = 2$, 3 or 4). The binary compounds of nitrogen which are described include NF_5, NF_4, $[NF_4]^+$, NF_3, $[NF_3]^+$, NF_2, $[NF_2]^+$, $[NF_2]^-$, NF, $[NF]^+$, $[NF]^-$, $[N_2F_5]^+$, N_2F_4, $[N_2F_3]^+$, N_2F_2, N_2F, $[N_2F]^+$ and N_3F; ternary compounds of fluorine and nitrogen ($F_xH_yN_z$ and $F_xN_yO_z$) will be described in Supplement Volume 5. This book therefore represents a strange and interesting mix of traditional inorganic chemistry and chemical physics. All aspects of synthesis, reactivity, structure, bonding, spectroscopy, thermodynamics and theory are discussed comprehensively, covering the literature up to the end of 1984. An interesting feature of this volume is the significant number of citations of the patent literature and of U.S. Government reports, harking back to the era when fluorine-oxygen compounds were being so actively studied as potential high-energy oxidizing agents for rocket fuel.

As can be taken for granted with volumes issued by the Gmelin Institute, the production, lay-out and illustration of this volume are immaculate. Extensive and thoughtful use is made of tabular material, and toxicity, and problems with storage and handling, are dealt with specifically. The nine authors and six editors have produced a work of scholarship which will become the standard reference work in this area. A chemistry library will not be complete without this volume, which describes a fascinating area of chemistry of much current interest.

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