

Gmelin handbook of inorganic chemistry, 8th edition, *F — Fluorine, Supplement Volume 5: Compounds with Nitrogen*, Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1987, xv + 251 pages, DM 987. ISBN 3-540-93546-0.

It seems, at first sight, remarkable that whereas twelve volumes of the Gmelin Handbook have appeared on the subject of perfluorohalogenated organic compounds of the main group elements, the current volume is only the sixth to be published describing the inorganic chemistry of fluorine. However, this is an artifact generated by the Gmelin System Number of fluorine, which is 5. Thus, only the Group 18 elements, hydrogen, oxygen and nitrogen have lower System Numbers, and so only compounds with these elements will appear in the fluorine volumes (metal fluorides, for example, will appear in the volumes appropriate to the metal). The volume under review is an update of the main fluorine volume (1926) and its first supplement (1959), and continues the coverage of fluorine nitrogen compounds which was initiated in Supplement Volume 4 (1986). Supplement Volume 4 described the binary compounds of nitrogen and fluorine (including NF_3 and N_2F_4): the volume under review describes ternary fluorine–nitrogen–hydrogen and fluorine–nitrogen–oxygen compounds, as well as F–N–O–H systems.

The principal compounds discussed in the $\text{F}_x\text{N}_y\text{H}_z$ section (76 pages) include $[\text{NH}_n\text{F}_{4-n}]^+$, NHF_2 , NH_3F_2 , $[\text{NHF}]$; $[\text{NHF}]^+$, $[\text{NHF}]^-$, NH_2F , $\text{N}_2\text{H}_2\text{F}_2$, $[\text{N}_2\text{H}_6]\text{F}_2$, N_2HF , $\text{N}_2\text{H}_3\text{F}$ and $[\text{N}_2\text{H}_5]\text{F}$: the section on difluoroamine is by far the most detailed (52 pages), and includes an account of its reactions with organometallic compounds. The $\text{F}_x\text{N}_y\text{O}_z$ section (137 pages) includes discussion of $[\text{F}_2\text{NOF}_2]^+$, F_3NO , $[\text{F}_3\text{NO}]^+$, $[\text{F}_3\text{NO}]^-$, $\text{F}_n\text{N}(\text{OF})_{3-n}$, $\text{F}_n\text{N}(\text{O}_2\text{F})_{3-n}$, F_3NO_2 , F_2NO , $[\text{F}_2\text{NO}]^+$, $[\text{NO}_2\text{F}_2]^-$, FNO , FON , FNO_2 , FONO , FONO_2 , $\text{F}(\text{O})_n\text{NO}$ ($n = 2-5$), $[(\text{NF}_3)_2\text{O}]^{2+}$, F_2NONF_2 , F_2NOONF_2 , F_2NNO , F_2NNO_2 , ONFNFNFO and F_2NOF : the compounds covered in the most detail are nitrogen oxide trifluoride, nitrogen oxide fluoride, nitrogen dioxide fluoride and fluoroxo nitrogen dioxide. Finally, the F–N–O–H section includes X_2NOX ($\text{X} = \text{H}$ or F), the FNO-HF system and the $\text{NO}_x\text{-HF}$ system. Thus, the contents of this volume represent an interesting mix of classical inorganic chemistry and chemical physics.

The team of authors (S. Jäger, J. von Jouanne, H. Keller-Rudek, P. Kuhn and S. Ruprecht) have produced an excellent and detailed account of the chemistry of ternary fluorine–nitrogen compounds. One very useful innovative feature of this volume is the inclusion of the CAS Registry Number for each of the compounds discussed, and this would make an invaluable addition to all future volumes of the Gmelin Handbook and its collective indices. This volume is, as expected for this series, superbly produced and a definitive source of information on the synthesis, reactivity, structure, bonding, spectroscopy, thermodynamics and theoretical calculations for ternary fluorine–nitrogen compounds up to and including 1985. All inorganic chemists will need access to this volume, and it should be in all serious chemistry libraries.

*School of Chemistry and Molecular Sciences,
University of Sussex, Brighton BN1 9QJ (Great Britain)*

Kenneth R. Seddon