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Book reviews

Gmelin Handbuch der Anorganischen Chemie, Erganzungswerk zur 8. Auflage, Vol. 9 and 12, Perfluorhalogenorgano-Verbindungen der Hauptgruppenelemente, Parts 1 and 2. A. Haas, vol. author, D. Koschel, vol. editor. Gmelin Institut fur Anorganische Chemie, Max Planck-Gesellschaft zur Forderung der Wissenschaften e.V., Verlag Chemie, Weinheim/Bergstrasse, 1973; Vol 9, 217 pp., DM 296, $114; Vol. 12, 247 pp., DM 331, $ 127.50

Treated in these two Gmelin volumes are all perfluorohaloorganic derivatives of sulfur, selenium and tellurium. Volume 9 is devoted entirely to divalent perfluorohaloorganosulfur compounds and Volume 12 completes the treatment of this compound class and continues with sulfur(IV) and sulfur(VI) derivatives and then with the perfluorohaloorganic compounds of selenium and tellurium. Future volumes will cover perfluorohaloorganic compounds of the other Main Group elements.

The compounds found in these volumes are Group VI derivatives whose organic carbon-bonded groups contain either only fluorine substituents or fluorine together with chlorine, bromine or iodine substituents. Thus, for instance, compounds with CF_3, CF_2Cl and $CFCl_2$ substituents qualify for inclusion, but those with CF_2H and CFH_2 substituents do not. The presence of other nonfluorinated substituents disqualifies a compound from inclusion. Thus sulfanes of type $(C_nF_{2n+1})_2S$ are covered, but those of type $C_nF_{2n+1}SC_nH_{2n+1}$ are not. Metal perfluorothiophenolates of type $M(SC_6F_5)_n$ are treated in Vol. 9, but those of type $R_mM(SC_6F_5)_n$ are not. The coverage of the subject matter as defined appears to be thorough. However, one does wonder whether such an arbitrary and restrictive definition of a field for a Gmelin volume makes any sense to anyone except the most parochial fluorocarbon chemist. Any chemist interested in organosulfur compounds containing one or more fluorinated substituents will find only a fraction of the compounds he might need to know about in these books. In any case, we must be grateful for any thorough, well-organized collection of data on individual compounds as long as the rules of coverage are well defined. The present volumes meet these criteria. For each compound or compound class there is a complete listing of preparative methods, physical and spectroscopic properties and chemical reactions. This information is brought in text and tabular form and is presented clearly and concisely.

The organometallic chemist may be interested in the coverage on transition metal complexes derived from some of the sulfur compounds and on preparatively useful metal mercaptide reagents such as $AgSCF_3$ and $Hg(SCF_3)_2$. Many other of the sulfur, selenium and tellurium compounds mentioned could have interesting applications in transition metal chemistry.

Both books are written in German, but English translations of the author's preface, the table of contents and chapter and section headings are provided. Volume 12 contains a formula index which covers both volumes. Literature coverage is complete to the end of 1971 but extends well into 1972.

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Formation of C—C Bonds, Vol. 1, Introduction of a Functional Carbon Atom, by J. Mathieu and J. Weill-Raynal, Georg Thieme-Verlag, Stuttgart, 1973, xxiv + 495 pp., DM 128.

It is the purpose of this three-volume series to systematize the known procedure for forming carbon—carbon bonds, with emphasis on the synthetically useful reactions. This, the first volume of the series, deals with those carbon—carbon bond-forming reactions which simultaneously introduce a new functional group at the new junction, i.e., $\geqslant C- + \geqslant C-Z \rightarrow \geqslant C-\overset{|}{\underset{|}{C}}-Z$. The chapters cover a large number of reactions including mono-, di- and trihalomethylation, mono- and dihalomethylenation, oxymethylation, thiomethylation and variants involving other oxidation states of sulfur, aminomethylation and its variants including diazomethylation, formylation, carboxylation, cyanation and carbamoylation.

The information on these reactions is presented by means of equations, many tables and brief textual material in footnote-style concerning scope and limitations, conditions, etc. Appropriate references to the primary and the review literature are provided. Organometallic compounds, mostly Grignard and organolithium reagents, but also some others, are used in quite a few of these reactions.

The formation of a carbon—carbon bond often is a key step in the synthesis of complex organic compounds and the synthetic chemist should find it very useful to have the reactions which accomplish this task evaluated critically and organized in a clear, systematic manner. This handsomely produced book can be recommended to all chemical libraries.

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