Science of Synthesis, Volume 30: Acetals: O/N, S/S, S/N and N/N and Higher Heteroatom Analogues; edited by J. Otera, Georg Thieme Verlag: Stuttgart, **2006**, hardcover, 800 pp, € 2200, ISBN 978-3-13-118821-2 (RoW) / US$ 2640, ISBN 978-1-58890-462-1 (US)

This volume of *Science of Synthesis*, edited by J. Otera is organised as typical in Houben–Weyl around the functional groups. Those involved are related to compounds possessing two heteroatoms geminally attached to the same carbon atom. It describes O/N, S/S, Se/Se, Te/Te, S/N, N/N, P/P, P/N acetals and compound possessing an oxidized sulfur or phosphorus moiety.

Among the various member of this class, N,N-acetals, S,S-acetals and Se,Se-acetals occupy the major place. In the case of S,S-acetals or dithioacetals, for example, the acyclic compounds are described apart from cyclic ones and in the latter class, the five- and six-membered dithiolanes and dithianes, which are the most frequently used, occupy a place of choice. The seven-membered analogues, dithiepanes, and the four-membered analogues, dithietanes, are described but the chemistry of the former is essentially similar to those of dithiolanes whereas dithietanes are strained and have been only sporadically used.

Most of those compounds have been prepared from the corresponding carbonyl compounds by thioacetalization. For each class the reactivity towards this end of aldehydes, ketones, aromatic compounds bearing electron-attracting or electron-donating substituents, cyclic ketones as well as hindered and functionalized carbonyl compounds, is fully described. Results from competition experiments between carbonyl compounds are particularly well documented.

Except in rare cases, thioacetalization requires acid catalysis to proceed. In each "Subclass" different "Methods" are carefully described and even "Variations" are provided. These allow the reader to immediately locate the most appropriate method he/she wants to use. For example for the synthesis of dithiolanes "Subclass" belonging to the S,S-acetals "Class", "Methods" involve reaction of ethane dithiol with aldehyde and ketones using as catalysts (Method 1) protic acids, (Method 2) Lewis acids, (Method 3) heterogeneous catalysts, (Method 4) halogens and derivatives… and several "Variations" are presented such as for protic acids: (Variation 1) hydrochloric acid, (Variation 2) 4-toluenesulfonic acid, …(Variation 4) solid protic acid.

The schemes are clearly presented and their headings properly describe their subjects. Many examples are properly disclosed in tables. The presence of well-described experimental procedures helps.

The volume describes for each "Class" (i) their syntheses, (ii) their reactivity, and, in some cases, (iii) the strategy involved in each process.

For example, 1,3-dithianes are identified as acyl anion equivalent. Their metallation and their alkylation, hydroxyalkylation and acylation are well documented. The transformation of S,S-acetals of various kinds to aldehydes and ketones is, for example, documented under "Deprotection of S,S-acetals".

The review includes related derivatives in which the sulfur atom is no longer part of a sulfanyl group but belongs to a sulfinyl or a sulfonyl moiety.

The synthesis and reactivity of Se,Se acetal is similarly described. The use of these compounds as acyl anion equivalents, as precursors of selenium-stabilized carbenium ions, carbanions and carbon-centered radicals is well presented.

The N,O-acetal class includes carbohydrate derivatives as well as nucleosides.

The table of contents organizes the data properly and allows the reader to locate them chronologically. The keyword index is also easy to use. For instance, the reader can rapidly locate the entries devoted to "synthesis of" or those involving instead "reactivity of".

This is an excellent book which properly describes the field for specialists as well as for those who incidentally want to enter in it. It is built from several comprehensive reviews articles written by scientists fully involved in the field.

Alain Krief, Facultés Universitaires N.-D. de la Paix, Namur, Belgium

SYNTHESIS 2008, No. 16, pp 2668–2668
Advanced online publication: 11.08.2008
Art ID: B11608SS
© Georg Thieme Verlag Stuttgart · New York

This document was downloaded for personal use only. Unauthorized distribution is strictly prohibited.