

Book review

Landolt–Börnstein. Numerical Data and Functional Relationships in Science and Technology. New series, Group II, Volume 17, Subvolume a. Magnetic Properties of Free Radicals; ed. by H. Fischer, Springer-Verlag, Berlin, 1987. viii + 507 pp. ISBN 3-540-16660-7. DM1280.

This sub-volume marks the commencement of a major programme of updating the data on the Magnetic Properties of Free Radicals contained in Volumes II/1 and II/9 a – d2 of this series. Twenty-two chapters are envisaged in this revision: this subvolume contains the first two substantial chapters. Literature coverage is up to late 1985; the data are mainly derived from EPR/ESR studies, with occasional ENDOR, microwave optical double resonance, electron spin echo, muon spin rotation, and laser magnetic resonance references.

The first chapter of 194 pages and about 700 references on inorganic radicals and radical ions is by J.R. Morton and K.F. Preston. Sixty-one tables cover radicals centred on atoms ranging from muonium to neptunium. Since “inorganic” is taken to mean “containing not more than one carbon atom” (except that ligands such as CO_2^- and CN are regarded as inorganic per se), the main organometallic interest of this chapter is the provision of data on “parent” radicals such as SiH_3^\cdot .

Chapter 2, on radicals in metal complexes, by A. v. Zelewsky, C. Daul, and C.W. Schläpfer, is longer (307 pages) but contains less than one-third of the number of references in chapter 1, partly reflecting the greater complexity of some of these radicals, and possibly a greater number of radicals per paper. The arrangement is by new-style groups of the periodic table, from 1 to 15.

This subvolume, and the accompanying subvolume reviewed below, are printed and produced with the high quality and clear layout traditionally associated with Landolt–Börnstein. It is a pleasure to look up data in such books.

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Landolt–Börnstein. Numerical Data and Functional Relationships in Science and Technology. New series, Group II, Volume 17, Subvolume b. Magnetic Properties of Free Radicals: Non-conjugated Carbon-centred Radicals, ed. by H. Fischer, Springer-Verlag, Berlin, 1987. vii + 551 pp. ISBN 3-540-16860-5. DM 1330.

This sub-volume is entirely devoted to a compilation by F.A. Neugebauer of the magnetic properties (mainly Electron Paramagnetic Resonance) of non-conjugated carbon-centred radicals, and supplements the earlier Volumes II/1 and II/9b. The

references (ca. 1000 papers and 50 reviews) mainly cover the period 1975–1985 with a few from 1986, and show the sustained interest in this topic during the decade.

Substituted non-cyclic alkyl radicals occupy more than half of this volume, arranged in the usual manner: primary, secondary, tertiary, with sub-sections and sub-sub-sections dealing with different radical types. Shorter sections cover monocyclic and polycyclic alkyl radicals and σ -electronic carbon radicals. Although there is no formula or radical index, this arrangement makes it easy to find the data on a particular radical. An index covering volumes II/1 and all subvolumes of II/9 and II/17 is promised at the conclusion of this revision, which will involve a further 19 chapters.

This arrangement of material makes it easy to identify radicals with metallic or metalloid substituents by homing in on the sub-subsections “Leading atom of R: Other than carbon”. Approximately 160 of the 3000 radicals are of this organometallic interest: most contain phosphorus, silicon or tin, although As, Ge, Hg, Mn, and Mo containing radicals are also represented.

Nearly one in ten of all the radicals featured in this volume (not just those with organometallic substituents) were prepared by methods involving organometallic reagents. The majority of these involve abstraction of a halogen atom from an organic halide by an organosilyl radical, but addition of organometallic radicals to multiple bonds also feature in substantial numbers, and these preparative methods show the impact that organometallic chemistry has had on structural and reactivity studies of organic free-radicals.

The numerical data in this review has mostly been compiled by sampling every tenth page. A check by the reviewer of ten relevant references taken from his personal database showed that all were present in this volume. All organometallic free-radical chemists will wish to have access to this well-produced, informative, and timely sub-volume.

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