

The text makes extensive use of tabulated data with detailed footnotes, thus giving maximized coverage to synthetic methods, and physical, spectroscopic and electrochemical properties. The literature coverage is overwhelmingly comprehensive, and the text is clear and well presented. However, the structural representations are very small and rather poorly formed and conceived, some showing artistic distortions of which Francis Bacon would have been proud. There are only four figures in the whole volume. It is very unusual for a volume of the Gmelin Handbook to be let down by its presentation, but this is a case where a little more care spent over the structural representations would have added substantially to the value of the text. Nevertheless, the volume is an invaluable compilation of synthetic, structural and spectroscopic data on an extremely important class of organometallic molecules. A must for all libraries.

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Gmelin Handbook of Inorganic Chemistry, 8th Edition, W — Tungsten, Supplement Volume A3: Physical Properties (continued); Springer-Verlag, Berlin, 1989, xiv + 274 pages, DM 1260. ISBN 3-540-93594-0.

This is the eleventh volume of the Gmelin Handbook to describe the chemistry of tungsten (System No. 54) since the main volume was published in 1933. Of these, six have dealt (five exclusively) with tungsten oxide species, and none have yet considered the vital areas of the coordination and organometallic chemistry of tungsten. The current supplement volume (A3) continues the description of the physical properties of the element which was initiated in Supplement Volume A2, completing the coverage of the properties of bulk tungsten, and complements an earlier volume (A1; 1979) which described the metallurgy and technology of tungsten.

The first section (63 pages) completes the description of the crystallographic properties of bulk tungsten started in Supplement Volume A2, and includes sections on deformation, cleavage, recovery and recrystallization. The second section (71 pages) concentrates on the mechanical properties of tungsten, and describes (*inter alia*) its density, elasticity, plasticity, hardness and ductility. This is followed by a description of the thermal (44 pages), electrical (51 pages), magnetic (14 pages) and optical (33 pages) properties of tungsten. Of particular interest, the section on the thermal properties includes the thermodynamic functions for tungsten metal (*n.b.* it melts at 3695 K, the highest melting point of all metals), the section on electrical properties includes the electron energy loss spectrum (EELS), and the section on magnetic properties includes magnetic susceptibility measurements, NMR and EPR spectroscopy, and cyclotron resonance. The surface properties of tungsten will be described in a future volume.

The authors (E. Koch-Bienemann, L. Berg, and G. Czack) have produced a scholarly and detailed literature survey (up to the end of 1987). Although of little direct interest to the organometallic chemist, this is an essential compilation for any detailed consideration of the physics and chemistry of tungsten. This volume meets

the high standards which one expects from this series, and is particularly well illustrated. It should form a part of any chemistry or physics library collection.

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