

*Gmelin handbook of inorganic chemistry*, 8th edition, Sc, Y, La–Lu Rare Earth Elements. Part D4: Coordination Compounds (Continuation), Springer-Verlag, Berlin, Heidelberg, New York, Tokyo, 1986, xviii + 377 pages, DM 1521. ISBN 3-540-93529-0.

This is the twenty-ninth volume which the Gmelin Institute has published concerning the chemistry of scandium, yttrium and the rare earth elements (System No. 39) to appear since the main volume was published in 1938: it is the sixth dealing specifically with their coordination compounds, and continues the coverage initiated in Parts D1–D3 (which described the chemistry of complexes with oxygen and/or nitrogen donor ligands). The volume under review (Part D4) describes the complexes of ligands containing sulfur, selenium, silicon, phosphorus or arsenic, along with complexes of 'biologically important' ligands and complexes with inorganic anions. Specifically, this volume contains details of the complexes of sulfoxides, sulfonamides, sulfamidates ( $[\text{N}_3\text{O}_6\text{S}_3]^{3-}$  and  $[\text{N}_4\text{O}_8\text{S}_4]^{4-}$ ), thiols and other mercapto derivatives, thiocarboxylic acids  $\{\text{RS}(\text{CH}_2)_n\text{COOH}$  and  $\text{RCOSH}\}$ , dithiocarbamic acids, thioureas, thiocarbamides, thiocarbazonones, thiosemicarbazones, thiocarbonodihydrazides, thioketones, sulfur-containing heterocycles, sulfides, selenoxides, bis(trimethylsilyl)amides, phosphines, phosphine oxides, phosphinic and phosphonic acids and esters, phosphoric acid esters, amides of phosphinic and phosphoric acids, tri- and tetra-metaphosphinic acids, thio- and dithio-phosphinic acids, dithiophosphoric acid esters, arsines, arsine oxides and other arsenic compounds, and small 'biologically important' ligands (including, for example, purines, riboflavin, dipeptides, nucleosides and nucleotides, but not proteins, DNA, RNA, ribosomes, etc.). For these complexes, full synthetic, structural, spectroscopic and thermodynamic data are given in a well illustrated and comprehensive account. However, the authors (E.R. Birnbaum and J.H. Forsberg), although having performed an exhaustive and admirable task in compiling this volume, seem to have little grasp of the basic principles and fundamental importance of photoelectron spectroscopy as applied to lanthanide complexes — for example, they totally missed the significance of the reports upon the electronic structure of the lanthanide bis(trimethylsilyl)amide complexes,  $[\text{Ln}\{\text{N}(\text{SiMe}_3)_2\}_3]$ , in their statement that for  $[\text{Ce}\{\text{N}(\text{SiMe}_3)_2\}_3]$  "the first ionization band is very weak" (sic, p. 112). Laying this faux pas aside, though, the quality of the rest of the text meets the normal exacting standards of the Gmelin Institute.

The last chapter deals with complexes of inorganic anions (e.g.  $[\text{LnX}_6]^{3-}$ , where  $\text{X} = \text{Cl}, \text{Br}, \text{I}, \text{NO}_3, \text{NCS}$  or  $\text{NCO}$ ), and their formation in solution, focusing particularly upon stability constant measurements. In part, this section is an update of the detailed treatment which has been given to some of these complexes in, for example, Parts B7 and C2–C6.

The volume concludes with an invaluable 26 page ligand formula index (compiled by H. Köttelwesch), primarily for Part D4, but cross-referenced to Parts D1–D3 where relevant. As with all volumes in this series, it will become the source book for its subject, and no active researcher in this area can afford not to have access to it. A must for all libraries!