

Book Review

The Chemistry of Cyano Complexes of the Transition Metals; by
A. G. Sharpe, Academic Press, London, 1976, xi + 302 pages,
£ 10.40.

This text complements and extends an earlier review of transition metal cyano complexes written by the author and B. M. Chadwick [Adv. Inorg. Chem. Radiochem., 8, 83 (1966)]. The attention of the reader should also be directed to a recent review of the complex cyanides of the metals of the titanium, vanadium, chromium and manganese groups [W. P. Griffith, Coordin. Chem. Rev., 17, 177 (1975)]. The present text involves a systematic coverage of the literature through the end of 1974, although a number of papers which appeared in 1975 are also described.

The first chapter is devoted to a relatively brief overview of some of the general aspects of the chemistry of cyano complexes, including the properties of the cyanide ion and related species, cyanide ion as a ligand, preparative methods, the structural chemistry of cyano complexes (the results of diffraction studies, and vibrational and electronic spectral studies), the thermodynamics of cyano complex formation, and kinetic aspects of the chemistry of cyano complexes. This is followed by a very short chapter on the cyano compounds of scandium, yttrium, lanthanum and the lanthanides, and actinium and the actinides. The remaining nine chapters are devoted sequentially to the cyano compounds of the remaining nine transition metal triads. Where applicable, the cyano compound chemistry of each

element is further subdivided by oxidation state, from the lowest to the highest.

As would be expected, the text is dominated by the cyano chemistry of iron and cobalt, which together account for about a third of the exposition. Special attention is focused on the thermodynamic properties of the $[\text{Fe}(\text{CN})_6]^{4-}$ and $[\text{Fe}(\text{CN})_6]^{3-}$ ions, the mixed oxidation state complexes of iron, the substituted cyano complexes of iron(II), iron(III) and cobalt(III), the addition reactions of the $[\text{Co}(\text{CN})_5]^{3-}$ ion, and the mechanism of formation of cobalt(III) cyano complexes.

Separate, sequential reference lists are provided for each chapter, enabling one to rapidly locate the point of citation for a listed reference. However, trying to find, from scratch, whether or not a given paper has been discussed is, as usual with this method of referencing, a tedious, time-consuming procedure. The addition of an author index would have been most helpful in this regard. A brief subject index is included, but it provides little more information than the table of contents.

In the words of the author, the intent of the text is "to give a balanced and critical survey of the state of knowledge of the chemistry of transition metal cyano complexes..., pride of place having been given to ... an objective account of the experimental facts." However, "no attempt was made to gloss over gaps or inconsistencies, or to conceal doubts about the reliability of some published work ... in the spirit of a helpful referee." It can safely be concluded that he has admirably succeeded in all of these endeavors. The resulting text represents the definitive summary of a body of knowledge which is growing in importance to all chemists, owing to its being

correctly viewed as a major component of organometallic chemistry, as opposed to its traditional, restricted place in classical inorganic chemistry.

When coupled with the recent, lengthy critical reviews of the coordination chemistry of its pseudohalide brethren, the cyanate, thiocyanate and selenocyanate ions [A. H. Norbury, Adv. Inorg. Chem. Radiochem., 17, 231 (1975); J. L. Burmeister, The Chemistry and Biochemistry of Thiocyanic Acid and Its Derivatives, A. A. Newman, Ed., Academic Press, London, 1975, pp. 68-130], it becomes readily apparent that the state of the art of pseudohalide chemistry has been covered to an unprecedented degree.

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