

Book Review

PROGRESS IN INORGANIC CHEMISTRY, Volume 26, S.J. Lippard, editor, John Wiley and Sons, Inc., New York/Chichester, 1979, vii + 489 pages, \$35.95.

Five distinctly different research topics in inorganic chemistry are surveyed in the latest issue of this well-received series of volumes dedicated to the task of reviewing current research thrusts. Included are a detailed subject index for the five review articles and a cumulative index for the full 26 volumes by author and accompanying review titles. Being typeset as opposed to the less expensive but less satisfactory photographic technique, the reproduction of print, figures, and tables is excellent.

The 43 page (48 refs.) survey, "A Local View in Magnetochemistry," by M. Gerlock covers primarily the author's experience in this area. Theoretical presentations of magnetic exchange pathways and paramagnetism are followed by illustrative examples and a plea for a wider application of the principles of magnetochemistry to our understanding of chemical bonding. "UV Photoelectron Spectroscopy in Transition Metal Chemistry," by Alan H. Cowley, is detailed, well documented (116 pp., 291 refs.), and illustrated with a number of tables and spectra. It is a survey of the technique of corroborating various molecular orbital theories with spectral values resulting from ionizing valence electrons in an attempt to determine MO energy levels for transition metal complexes, primarily metal carbonyls and their derivatives.

The third chapter, "Direct Fluorination: A 'New' Approach to Fluorine Chemistry," by Richard J. Lagow and John L. Margrave is mainly a survey (50 pp., 101 refs.) of the diverse laboratory

experiences of these authors in the area of fluorination of hydrocarbons and substituted hydrocarbons. There is some discussion of kinetic and thermodynamic factors, alternative fluorination methods, and finally a proposal for the method of the future: direct fluorination controlled by temperature adjustment. "Metal-Metal Bonds of Order Four," by Joseph L. Templeton (90 pp., 255 refs.) surveys one aspect of the increasingly popular topic of transition multiple metal-metal bonds. Only dimeric systems containing quadruple metal-metal bonds are reviewed. Following a general discussion and characteristic properties of the phenomenon, an extensive list of previous reviews and a systematic discussion of several examples of quadruply bound metal-metal complexes are presented. Apparently all known examples (at least until mid-1978) are tabulated or displayed in figures. This review is concluded with a discussion of ligand substitution reactions, x-ray crystallographic data, MO schemes, electronic spectra, Raman vibrational data, and redox reactions.

The final chapter, "The Chemistry of the Dithioacid and 1,1-Dithiolate Complexes, 1968-1977," by Dimitri Coucouvanis (169 pp., 645 refs.) is the most voluminous and most ambitious of the volume. Dithio complexes of both nontransition elements and transition metals are discussed along with an extensive listing of x-ray structural data (S-M-S bond angles; and M-S, C-N, and C-S bond lengths) and a sprinkling of spectral (infrared, esr, Mossbauer, nmr, and visible), magnetic, and electrochemical data. The chapter concludes with a discussion of substitution, sulfur addition, carbon disulfide elimination, and dithiolate with Lewis acid reactions.

Each of the five surveys in Volume 26 will serve as an excellent foundation for a literature search for the researcher or as interesting reading for the student of inorganic chemistry.

Department of Chemistry
Memphis State University
Memphis, Tennessee 38152 (USA)

Larry W. Houk