

complex where only the *n*-butyl-substituted complex has been isolated in the alkylation reaction.²⁰ Finally, the ability to monoalkylate **2** to produce the mixed iodo-alkyl complex **8** opens the pathway to investigate the interactions of different types of reactive groups attached to these dinuclear compounds. Further studies directed toward

(18) Other differences are currently being studied. For instance, preliminary results indicate that the reaction of **8** with AgBF_4 in the presence of olefin does not give an alkyl-olefin complex as would be expected.¹⁹ A full account will be reported later.

(19) Reger, D. L.; Coleman, C. J.; McElligott, P. J. *J. Organomet. Chem.* 1979, 171, 73-84.

(20) Reger, D. L.; Coleman, C. J. *Inorg. Chem.* 1979, 18, 3155-3160.

(21) Camille and Henry Dreyfus Award for Newly Appointed Faculty, 1980.

exploring the reactivity of complexes **2** and **3** and their derivatives are subjects of a continuing investigation.

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Book Reviews

Gmelin Handbook of Inorganic Chemistry, 8th Edition, Au, Organogold Compounds. H. Schmidbaur, volume author, A. Slawisch, volume editor. Gmelin Institut für Anorganische Chemie der Max-Planck-Gesellschaft zur Förderung der Wissenschaften and Springer-Verlag, Berlin/Heidelberg/New York. 1980. vi + 351 pages. DM 789. \$465.60.

We have in this new Gmelin volume a comprehensive treatment of organogold chemistry: 296 pages of text packed with everything that is known about gold compounds in which there is a gold-carbon bonding interaction. The compounds which the reader will encounter range in stability from the elusive matrix-isolated gold carbonyls to the very stable phosphorus ylide complexes of gold. Although organogold chemistry, until recent years, has not been investigated by many research groups at any one time, the accumulated results, dating back to the preparation of the first organogold compound in 1907 by Pope and Gibson, are impressive indeed: the empirical formula index for this volume requires 19 pages, with 50-60 compounds listed per page!

The organization of the material in this book follows the rules which have been established for the Gmelin volumes on organometallic compounds. The book begins with a discussion of mononuclear organogold compounds and continues with dinuclear compounds (regardless of how the two gold atoms in the molecule are connected) and then with compounds of higher gold nuclearity, to the last chapter, which covers polymeric organogold compounds. Within each of these chapters the compounds are presented first of all according to organic ligand hapticity, then according to organic ligand type and number and gold oxidation state (I or III). Included among the organic ligands bonded via one C atom are alkyl, aryl, alkenyl, and carbene groups; among those of higher hapticity are olefins and polyolefins, acetylenes, carboranyl groups, and chelating alkylene and dienyl groups. Of special interest are the gold compounds with trialkylphosphonium methylide and dialkylphosphonium bismethylide ligands which were discovered and studied with great vigor by the author of this book and the intriguing salts of 1,1-bis(triorganophosphinegold(I))-substituted olefins, arenes, ferrocenes, and cymantrenes discovered by Nesmeyanov, Perevalova, and their co-workers, who have contributed so much to other aspects of modern organogold chemistry.

The coverage of organogold chemistry in this book is as exhaustive as "Chemical Abstracts" allows, with references to original research papers, theses, and conference reports and to the review literature through the end of 1979. All known details about the compounds covered are provided in text and tables: preparation, physical, and spectroscopic properties, theoretical studies, chemical studies, and applications.

As mentioned, a formula index is provided. There also is a ligand formula index, and the long and very detailed table of

contents will quickly guide the reader to the section he wants.

This book is one of the new-style "Gmelins" in that it is written in English. It is a welcome addition to the Gmelin Handbook series on organometallic chemistry, and it will be the definitive treatment of the organic compounds of gold for some years to come.

Dietmar Seyferth, *Massachusetts Institute of Technology*.

The Chemistry of Catalytic Hydrocarbon Conversions. Edited by H. Pines. Academic Press, New York. 1981. xiii + 305 pages. \$35.00

The first chapter of this eight-chapter book describes "Acid-Catalyzed Reactions", including a discussion of zeolite-catalyzed cracking, and comprises more than 40% of the entire treatise. In considering nomenclature a better case than the author admits to can be made for the use of the term "carbenium ion" to describe the carbocations, R_3C^+ (R may be hydrogen, alkyl, or aryl). Enium and onium are generic terms. Carbenium ion thus refers to an enium ion having a positively charged carbon atom possessing six valence electrons. Carbonium logically refers to an ion having a charged carbon with a coordination number greater than three. Other chapters in the book are, in order: Base-Catalyzed Reactions: Heterogeneous Hydrogenation; Dehydrogenation and Cyclodehydrogenation (Aromatization); Oxidation; Homogeneous Catalysis by Transition Metal Organometallic Compounds; Metathesis of Unsaturated Hydrocarbons; and Synthesis of Liquid Hydrocarbons (Synthetic Fuels). The first, second, and fourth chapters describe work to which the author has made substantial contributions; these contain many fascinating nuggets of information. The last three chapters are rather cursory treatments of important current topics that are discussed in more complete and sophisticated detail in other books and reviews.

It is difficult to determine exactly what kind of audience this book is intended for and the preface provides little guidance. However, students with a good undergraduate course in organic chemistry should have no trouble understanding most of it. It is disappointing not to find in a book dealing with catalysis clear definitions of terms such as selectivity and turnover number.

As the author points out, the chemistry of catalytic hydrocarbon conversions is of enormous practical importance to all industrialized nations and is at the core of the petroleum and associated industries. The preeminence of the United States in this field during the period 1945-1960 was due in no small measure to a small group of talented chemists and chemical engineers. It would have been a treat if the history of this exciting achievement could have been worked into this book by one of the major contributors to this effort.

Milton Orchin, *University of Cincinnati*.