make this a nicely descriptive chapter. The systems described include the reaction of transition metals (Cu, Ni, Pd, Co, Rh) and alkali metals (Li, Na, Cs) with diatomic gases (N_2, O_2, CO, Cl_2). In several cases the effects of isotopic substitution and/or the use of mixed ligands are described (to give $Ni(C^{18}O)(^{14}N_2)(^{15}N_2)_2$ for example). Matrix site effects and molecular distortions are considered in some detail and the mode of bonding between the metals and ligands are elaborated upon. Even intensity calculations, force constant calculations, and certain thermodynamic considerations are dealt with. All in all this well-written article contains just about everything you would want to know about reactions between metals and gases in inert gas matrices.

This book is printed using offset type, which makes it possible to publish the material without too much time delay. Spectroscopists as well as chemists with interests in force constant calculations or low-temperature molecular species will find this a highly useful volume.

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The Organic Chemistry of Nickel, Volume II, Organic Synthesis; by P.W. Jolly and G. Wilke, Academic Press, New York/San Francisco/London, 1975, xv + 400 pages, $ 48.00, £ 24.

This book consists of six chapters which thoroughly treat the uses of nickel complexes in organic synthesis. The coverage is truly encyclopedic, extending from the initial discoveries in the area through papers in the literature of 1974. Over 1300 papers and 800 patents are cited. This bringing together of results from both industrial and university laboratories leads to a unified treatment of the field, and makes this book an invaluable reference source. The data are presented in great detail, and collected in extensive tables, allowing rapid visual retrieval of desired information as well as reference to its appearance in the primary chemical literature. The reactions are grouped by the type of chemical conversion involved (see below). For each reaction type, mechanistic considerations are presented and discussed critically in light of current knowledge. This combination of extensive and detailed data presentation, and broad literature and patent coverage, with critical comments on published material in a remarkably readable text makes this book outstanding.

The first chapter discusses the oligomerization, cooligomerization, polymerization, isomerization, hydrogenation and hydrosilation and hydrocyanation of olefins catalyzed by nickel complexes, as well as the oligomerization of strained olefins and alkanes. Catalyst preparation, effect of added ligands on the reaction, as well as mechanistic considerations for the various transformations are discussed in some detail. The second chapter treats the nickel-catalyzed oligomerization of alkynes, cooligomerization of alkynes with alkenes and 1,2-dienes, hydrosilation of alkynes, and the telomerization of allene in a similar fashion. Chapter three deals with the cyclodimerization, cyclotrimerization, linear oligomerization, and telomerization of 1,3-dienes, as well as the cooligomerization of 1,3-dienes with olefins and alkynes and the preparation of macrocyclic polyenes. The authors state, "It is doubtful whether a mechanistically better understood family of reactions exists in the whole of transition metal catalysis" and go on to demonstrate the accuracy of their statement, by discussing in detail the mechanisms of these reactions. The polymerization of butadiene, isoprene and related dienes, and copolymerization of dienes is considered in chapter four.

In contrast to the preceding chapters which deal with catalytic processes, chapter five discusses primarily the coupling of organic halides by stoichiometric amounts of zero valent nickel complexes. Thus the coupling of allylic halides to form biallyls, the cross coupling of allylic and nonallylic halides, the coupling of nonallylic halides, and the reactions of π-allylnickel complexes with aldehydes, ketones, epoxides, and quinones are detailed. In many of these cases the mechanistic aspects of the reactions are little studied and poorly understood, and the discussion is, by necessity, more speculative. This chapter also treats the nickel-catalyzed reaction of organic halides with Grignard reagents.

The final chapter discusses carbonylation reactions involving nickel complexes. The carbonylation of alkynes, alkenes, olefins, alcohols, ethers, esters, aldehydes, and amines both by the stoichiometric reaction of these substrates with nickel carbonyl, and the catalytic processes involving nickel salts and an atmosphere of carbon monoxide are presented in detail. This material is followed by a consideration of the nickel promoted carbonylation of organic halides. Specifically, the reaction of allyl halides with carbon monoxide, and with carbon monoxide and alkynes or olefins to produce a variety of cyclic carbonyl compounds is treated in detail. The carbonylation of alkyl, aryl, and vinyl halides, carbonylations involving organolithium reagents and decarbonylation reactions are also presented in this final chapter.

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Gmelin Handbook of Inorganic Chemistry. New Supplement Series. Vol. 16. Organonickel Compounds, Part 1 (vi + 419 pages, DM 694, \$ 298.50); *Vol. 17, Organonickel Compounds, Part 2* (viii + 402 pages, DM 618, \$ 252.20); *Vol. 18, Index for Parts 1 and 2* (129 pages, DM 198, \$ 81.20), A. Slawisch, Volume Editor-in-Chief, Gmelin-Institut für Anorganische Chemie und Grenzgebiete der Max-Planck-Gesellschaft zur Förderung der Wissenschaften, Springer-Verlag, Berlin/Heidelberg/New York, 1975.

Organometallic chemists specializing in organonickel chemistry are well served indeed by the review literature. A recent two volume book by Jolly and Wilke provides an excellent review of all aspects of this area, and now we have a complete, up-to-date compendium of all known organonickel com-