petroleum, but some for use as reagents in organic synthesis.

About 40% of the book (i.e. 156 pages) is devoted to the compounds $Me_3PbR'$, including $Me_3PbEt$ which takes up 50 pages; remarkably, only 4 pages are required to deal with the chemical reactions of the latter compound, the studies of it having been largely focused on its physical properties, toxicity, environmental effects and uses. Much the same distribution of space applies in the case of the compounds $Et_3PbR'$, which take up 55 pages, and $Ph_3PbR'$, which takes up 124 pages. A great amount of information is clearly and concisely made available, much of it in tables. Coverage of the literature is complete up to the end of 1994, and extends to the more readily available journals up to mid-1995. There is a useful formula index.

Anyone engaged in research on organolead compounds should have access to this excellent series, either to the printed volumes or on-line.

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*PII* S0022-328X(96)06936-7

*Multiply Bonded Main Group Metals and Metalloids*, R. West and F.G.A. Stone (eds.), Academic Press, San Diego, 1996, 408 pp. + xi, $65.00, ISBN 0-12-744740-7

This book, timely and of high quality, is a paperback edition of *Advances in Organometallic Chemistry*, Volume 39. Concerned with a field of chemistry in which there is much current activity, it presents an excellent set of authoritative reviews of several of the main topics by authors who are among the leaders in the areas covered.

The reviews are as follows: multiple bonding involving the heavier Main Group 3 elements Al, Ga, In and Tl (69 pages, 152 refs.) by P.J. Brothers and P.P. Power; the chemistry of silenes (88 pages, 223 refs.) by A.G. Brook and M.A. Brook; iminosilanes and related compounds – synthesis and reactions (33 pages, 55 refs.) by I. Hemme and U. Klingebiel; silicon–phosphorus and silicon–arsenic multiple bonds (36 pages, 46 refs.); chemistry of stable disilenes (43 pages, 105 refs.) by R. Okazaki and R. West; stable doubly bonded componds of germanium and tin (49 pages, 115 refs.) by K.M. Baines and W.G. Stibbs; diheteroferrocenes and related derivatives of the Group V elements arsenic, antimony and bismuth (28 pages, 57 refs.) by A.J. Ashe III and S. Al-Ahmad; boron–carbon multiple bonds (36 pages, 113 refs.) by J.J. Eisch.

Most of the reviews are concerned with 'unsaturated' species that would conventionally be shown as having double bonds to the Main Group elements, e.g. $R_2Si{=}CR'_2$, $R_2Si{=}SiR_2$, $R_2Si{=}NR'$, $R_2Ge{=}PR'_2$, or in the case of the diheteroferrocene derivatives of Group 15 elements, aromatic rings incorporating the Main Group element. However the first review, a well-organized survey by P.J. Brother and P.P. Power, largely deals with the question of what would commonly be thought of as partial double bonding in formally saturated species such as $R_2MER'_2$, where M is a Group 3 element and E a Group 5 or Group 6 element (e.g. $R_2GaPR'_2$, $R_2AlOR'$), but also with anions such as $[R_2AlAlR_2]^-$; for many readers the section dealing with possible $\pi$-bonding in compounds having a Main Group element bonded to a transition metal will be of special interest. Likewise, much of the well-informed and interesting survey of boron–carbon multiple bonds is concerned with partial double bond character that in valence-bond terms can be represented in terms of resonance between canonical forms such as (in the simplest case) $R_2C{=}CR{-}BR'_2$ and $R_2C^+{-}CR{=}B^-R'_2$, but classically unsaturated species, such as Paetzold's stable $(Me_3Si)_2C{=}BBu^t$, and anions of the type $[RC{=}BR']^-$ are also discussed.

The presentation is good, with high quality print and clear diagrams, and there is a satisfactory subject index. The editors and authors are to be congratulated on this book, which represents very good value by today's standards. But its content is, of course, already available in libraries that subscribe to the excellent *Advances in Organometallic Chemistry* series.

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*PII* S0022-328X(96)06937-9

*Metal-Containing Polymeric Materials*, C.U. Pittman Jr., C.E. Carraher Jr., M. Zeldin, J.E. Sheats and B.M. Culbertson (eds.), Plenum Press, New York, 1996, 518 + x pages, US$125.00, ISBN 0-306-45295-2.

This is the fifth in a series based on lectures given at successive symposia of the American Chemical Society devoted to this topic; this volume relates to the meeting in August 1994 (Washington, DC). As the authors remind us in the preface, this is an area where organometallic and inorganic chemistry necessarily link with polymer science, materials science, catalytic studies and biochemistry to produce a distinctive interdisciplinary flavour. The actual and potential technological and economic significance of these materials has led to a huge increase in research activity; chemists have made pivotal contributions, and this book is largely written from a chemical perspective.

The book opens with a helpful 35-page overview of the whole area of inorganic and organometallic polymers, contributed by the editors. This includes discussion of silicones and polyphosphazenes as well as polymers with transition metal atoms in the backbone and coordination polymers. The 36 chapters which follow are almost all detailed accounts of recent original work on these systems (except phosphazenes), together with polymers containing pendant metal-containing groups and metal-impregnated polymers. To give some examples which illustrate the scope of these articles, ring-opening polymerisation of metallocenophanes has yielded $[-Y(\eta\text{-}C_5H_4)M(\eta\text{-}C_5H_4-]_x$ polymers ($Y = SiR_2$, $GeR_2$, $CH_2CH_2$; M = Fe, Ru); pendant groups containing $Os_3$ and $(C_2B_9)_2Co$ (dicarbollide) clusters have been attached to the phenyl rings of polystyrene; soluble and thermally stable coordination polymers of Ce(IV) and Zr(IV) with bis-tetradentate Schiff bases are described; both polysilanes and polysiloxanes with pendant metal carbonyl groups have been prepared; there are structural studies on metallosiloxanes with Si–O–M backbones (M = Mn, Ni, Cu); silver compounds incorporated in polyimide films can be reduced and migrate to form a reflective surface coating of silver; and the polymeric product prepared by the reaction of gibberellic acid with $(\eta\text{-}C_5H_5)_2TiCl_2$ retains the plant growth-promoting properties of the parent acid. Also transition metal compounds are shown to catalyse the oxidative polymerisation of disulphides or thioethers to poly(phenylenesulphide), while the Ziegler–Natta catalyst system $TiCl_4/Et_2AlCl$ or peroxotungstate(VI) groups attached to polystyrene catalyse alkene polymerisation and epoxidation respectively. Metal-containing biopolymers are the subject of a long review chapter, while there are also accounts of metallopeptide production and electron transfer reactions in metalloproteins.

Many of these systems have obviously been studied with applications in mind. Some can, on pyrolysis, produce useful ceramics and others can function as semiconductors, non-linear optical materials, optoelectronic devices, liquid crystals, and magnetic materials. For the organometallic chemist already working in this area or wishing to enter it, this volume offers a valuable wide-angle snapshot of the current situation. The book is well produced and indexed, and can be warmly recommended.

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*PII* S0022-328X(97)00010-7

*Gmelin Handbook of Inorganic and Organometallic Chemistry. Ga. Gallium. Suppl. Vol. C2, Compounds with Nitrogen.* Springer-Verlag, Berlin, 8th edn., 1996, 230 pages + xiii, DM 1425.00, ISBN 3-540-93731-5.

This supplement to the series on gallium compounds deals wholly with inorganic compounds but will be of direct interest to organometallic chemists interested in the formation of gallium nitride and related compounds.

About 80% of the volume is taken up by the important species $\alpha$-GaN, which has considerable potential for applications in high-power and high-frequency electronic and opto-electronic devices such as semiconductor lasers, light-emitting diodes, and optical detectors. The account deals with its preparation and formation (as crystals and films), its crystallographic, mechanical, thermal, magnetic, electric, optical, and dielectric properties, and with its chemical reactions.

The remainder of the volume deals with inorganic gallium compounds containing both nitrogen and hydrogen [e.g. $(H_2GaNH_2)_3$, $Ga(NH_2)_3$] (10 pages) and those containing nitrogen along with oxygen and/or hydrogen [e.g. $Ga(NO_3)_3$, $Ga(NO_2)_3$, $GaO_xN_y$, $GaO_xN_y$, $Ga(OH_2)NO_2$] (27 pages, 18 of them devoted to $Ga(NO)_3$ and its hydrates). As is usual in Gmelin volumes, a massive amount of information is presented clearly and concisely.

The authors, H. Katscher and B. Mohsin, are to be thanked for this very useful compilation.

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*PII* S0022-328X(97)00098-3