

Book Reviews

Solids and Surfaces. A Chemist's View of Bonding in Extended Structures. R. Hoffmann, VCH Verlagsgesellschaft, Weinheim/Basel/Cambridge/New York, 1988. 142 pp. with 177 figures and 4 tables. Price DM 48, £16.25.

The book is a brief *ab initio* treatment of problems with surfaces from a chemist's point of view. The material of the book has been previously published in two articles in *Angewandte Chemie* and *Reviews in Modern Physics* and it is here extended and completed. The book is formed by short and simple paragraphs which gradually introduce solid-state physics and chemistry. The treatment begins with one-dimensional systems (PtH_4^{2-} or $\text{Pt}(\text{CN})_4^{2-}$ as models), drawing their orbitals and bands. Then the author examines two-dimensional materials, explaining the correct and easy approach to these systems. At this point it is possible to introduce surface problems; for example how CO chemisorbs on Ni, or H_2 dissociates on a metal surface. The electronic states of the systems are studied by introducing the DOS (density of states) concept. Then a simple problem in the solid state is studied as a no more complicated extension of what was already explained. A brief excursion into the third dimension is made and the book finishes with a comparison of traditional studies with solids.

The language of orbital interactions and perturbation theory provides a tool that is applicable to the analysis of these highly delocalized systems, just as it works for small, discrete molecules. Here the orbitals develop into bands, the width of which depends on the inter-unit-cell overlap.

In conclusion, in this book the author has formed a link between chemistry and physics by introducing simple band structure perspectives into chemical thinking about surfaces and has interpreted these delocalized band structures from a chemical point of view. The book is useful not only for specialists, but also for researchers who enter this area.

Roberta Bertani

Inorganic Syntheses, Vol. 25. Editor-in-Chief H. R. Allcock, Wiley, West Sussex, U.K., 1989, 300 pp. Price £31.40.

The purpose of the *Inorganic Syntheses* series of volumes is to provide the chemical research and education communities with well-documented and

thoroughly tested procedures for the synthesis of important and useful inorganic compounds. Chemical synthesis plays as central a role in inorganic research in 1989 as it always has and, with the exponential growth of new preparative techniques and interesting classes of substances, the need for carefully documented and reliable synthetic procedures is perhaps greater than ever before. In addition, the contemporary expansion of inorganic chemical research into non-traditional areas as diverse as polymers, ceramics and pharmacologically-active substances places further demands on *Inorganic Syntheses* coverage. The Editor of the present contribution has attempted to include several of these non-traditional areas within the scope of *Inorganic Syntheses*, Vol. 25 and, combined with the sections on more traditional molecular substances, has produced a high-quality addition to this outstanding series.

Chapter One focusses on the preparation of ring systems and related compounds of the main group elements. The coverage includes useful syntheses of cyclophosphanes, cyclophosphazenes and a wealth of sulfur–nitrogen compounds. Chapter Two deals with inorganic polymers and provides well-documented syntheses of several polyorganosilanes and a large number of useful polyphosphazenes. The focus of Chapter Three is on compounds of pharmacological interest, and the syntheses deal with boron analogs of amino acids, aziridinyl-substituted cyclophosphazenes, and *cis*-diammineplatinum α -pyridone blue. Chapter Four deals with a variety of metal compounds, ligands and coordination complexes. Particular noteworthy is the section on alkyl or aryl hydroxo complexes of Pt(II), tris(bidentate ligand)-Ru(II) complexes, μ -thiolato dimanganese complexes, methylenebis(dimethylphosphine), optically pure tris(oxalato)chromate(III) complexes (either enantiomer) and anhydrous lanthanide trichlorides via an improved version of the traditional ammonium chloride route. The focus of Chapter Five is on transition metal organometallic compounds, and useful syntheses include bis(phosphine) derivatives of iron pentacarbonyl, μ -dialkylphosphido- and μ -dialkylarsenido-dimolybdenum, dirhodium, dinickel and dicobalt organometallic compounds, a series of dinuclear cyclopentadienyl ruthenium complexes, a series of iodo osmium carbonyl complexes, and several mixed cobalt–osmium hydridocarbonyl clusters.

The text is generally free of typographical errors, and hazards are adequately highlighted. Both subject