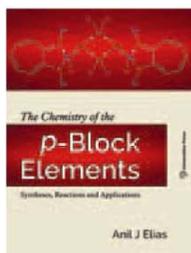


A Compelling and Complete Account of *p*-Block Chemistry

Ramaswamy Murugavel



The Chemistry of the p-Block Elements: Syntheses, Reactions and Applications

Author: Anil J. Elias

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I had the pleasure of reading *The Chemistry of the p-Block Elements: Syntheses, Reactions and Applications*, written by Anil J. Elias, over the Christmas holidays. Teaching main group chemistry for the last two decades at IIT Bombay, I have often felt the need for an alternative source (an informative textbook) on the subject, other than the one which I have been using for many years (*Organometallics*, various editions, by Christoph Elschenbroich). Although Elschenbroich's book packs a wealth of information on main group organometallic chemistry, it lacks both in- and end-chapter problems, which in my opinion are important for

in-depth learning of the subject. Secondly, the focus of Elschenbroich's book has been mainly on the organometallic compounds of *p*-block elements rather than on the aspects of other non-organometallic compounds formed by these elements, necessitating the use of an additional textbook for non-organometallic compounds of *p*-block elements.

The first impression I got as soon as I picked up the book by Elias was that this was an exhaustive text (of some 600+ pages) that covered almost everything relevant to the *p*-block elements. The book is presented in the form of fifteen chapters for the ease of grasp and appreciation of the chemistry of group 13–18 elements that has evolved over the years.

The book begins with an introductory chapter, which is quite unlike what one normally encounters in textbooks. The author has tactically commenced his book by placing the importance of *p*-block compounds upfront in this chapter (Section 1.1). This is particularly important in today's context when students want to know the day-to-day application of anything they learn. I am sure that this section will convince most of the chemistry major students why they should be reading and learning the remaining contents of the book. Another highlight of this chapter (Section 1.2) is the table that lists the milestones in *p*-block chemistry starting right from ~ 3000 B.C. (and until 2017). There may have been a few misses, but this table nicely captures the evolution of chemistry of *p*-block elements from ancient times through the modern times.



Chapter 2 that describes the structure and bonding in p -block is the most important part of the book in my opinion, where bonding models such as valence shell electron pair repulsion (VSEPR), inert pair effect and hypervalence have been discussed in detail. This chapter presents alongside the classical ideas (e.g. d -orbital participation), many modern concepts (use of σ^* orbitals). It is also good to see a short section on the importance and resurgence of dative bonding to explain low-valent B(0), C(0), and Si(0) compounds.

Chapters 3–15 essentially describe in detail the chemistry of the entire p -block. I was very much awed by the thoroughness of the material presented in these chapters. While patiently flipping through the pages, it often occurred to me that this book could also double up as an entry-level reference book for any student starting PhD work in p -block chemistry. Since all these chapters are structured in a similar fashion (isolation, purification, reaction chemistry, bonding concepts, applications, and recent developments, in that order), I will refrain from describing what is contained in each of these chapters. A point to note is that, where necessary, the author has treated more important elements (such as B, N, O, F, Si, and P) as separate chapters to justify the vast chemistry known for these elements, while bunching the heavier elements with similar chemistry in each group.

Following are the impressions the book leaves you with. The author has definitely kept his promise from the preface that this book will not simply list a deluge of reactions for each element, but will present only carefully se-

lected reactions that are relevant for already established applications and those which have a potential for future applications. The end-chapter ‘Problems and Exercises’ will be very useful for the students to test their understanding. The book has been very nicely typeset, and the schemes are presented very clearly. The book is also reasonably priced and is affordable for the students. I suggest this book as a standard text for both senior BSc and MSc students in various universities, IITs and IISERs. In places where an integrated MS program is offered, it is wise for the teachers to cover the contents of this book over two courses: one at 300 level and another at 500 level. Selected parts (mainly the recent developments section in each chapter) can be taught as modules in advanced level organometallic courses for MSc and PhD students.

This book falls short in one aspect. Most of the undergraduate and postgraduate chemistry major students in Indian universities take a course in main group chemistry and not in the chemistry of p -block elements. This book would soon become a standard textbook for p -block chemistry, but I would like the s -block also to be included in a future edition so that the students do not have to look for two books to learn main group chemistry.

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