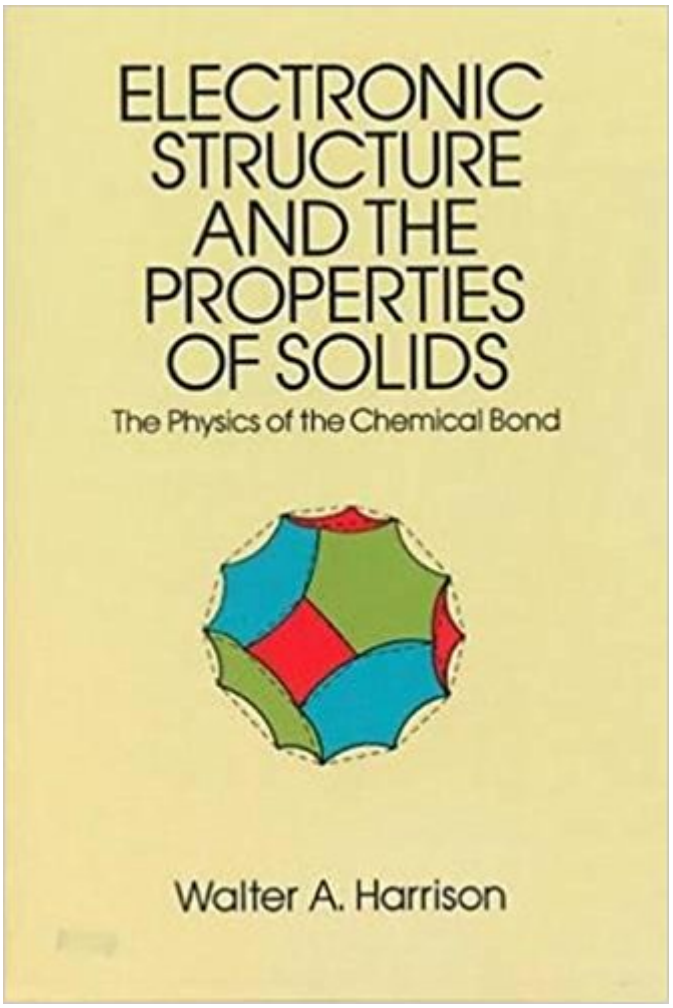
Electronic Structure And The Properties Of Solids: The Physics Of The Chemical Bond (Dover Books On Physics)



Synopsis

"Should be widely read by practicing physicists, chemists and materials scientists." Ã¢â ¬â • Philosophical MagazineIn this comprehensive and innovative text, Professor Harrison (Stanford University) offers a basic understanding of the electronic structure of covalent and ionic solids, simple metals, transition metals, and their compounds. The book illuminates the relationships of the electronic structures of these materials and shows how to calculate dielectric, conducting, and bonding properties for each. Also described are various methods of approximating electronic structure, providing insight and even quantitative results from the comparisons. Dr. Harrison has also included an especially helpful "Solid State Table of the Elements" that provides all the parameters needed to estimate almost any property of any solid, with a hand-held calculator, using the techniques developed in the book.Designed for graduate or advanced undergraduate students who have completed an undergraduate course in quantum mechanics or atomic and modern physics, the text treats the relation between structure and properties comprehensively for all solids rather than for small classes of solids. This makes it an indispensable reference for all who make use of approximative methods for electronic-structure engineering, semiconductor development and materials science.The problems at the ends of the chapters are an important aspect of the book. They clearly show that the calculations for systems and properties of genuine and current interest are actually quite elementary. Prefaces. Problems. Tables. Appendixes. Solid State Table of the Elements. Bibliography. Author and Subject Indexes."Will doubtless exert a lasting influence on the solid-state physics literature." Ã¢â ¬â • Physics Today

Book Information

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Customer Reviews

In this comprehensive and innovative text, Professor Harrison offers a basic understanding of the electronic structure of covalent and ionic solids, simple metals, transition metals and their compounds.

Book was in very good shape. Author does decent job of balancing the "why" and the "how". Math is summarized rather than illuminating.

Just read the first chapter, feel like this is the book I want, for a physics graduate student. Well explained.

If you are studying the solid state physics, it is a necessary book for you. It covers various properties of almost all kinds of solid state materials and shows pretty new experimental data from reliable sources. This book also starts with a clear introduction in each chapter so that even for a beginner, it is easy to read. This book will be a good reference book for you to find out the definition of terminologies in this field. Personally, I use this book as a referece frequently.This book is definitely not a book you can read through quickly but a book where you find out information through your life.If you are a scientist and interested in solid state physics like semiconductor or metal, this is also a good book to get a good guide and introduction.

The idea behind this book is that a beginning graduate student can do approximate electronic structure calculations, solving nothing more than the quadratic equation, with the approximations provided. The approximate models are said to aid understanding and train intuition. It’s a nice idea, but given the easy accessibility to electronic structure codes and powerful computers these days, it’s antiquated: ones first approach would instead be to calculate! Worse, the pedagogical style in the book is such that it doesn’t really train intuition either. I spent a lot of time trying to understand this book and I can’t say that my effort was rewarded. Positive features: scope, historical interest, and low price from Dover.

This book has no parallel in the literature of theoretical materials science. The information contained

in the book allows first principle calculations of properties of important technological materials like perovskite oxides, semiconductors, etc. I would suggest the reader to consult the papers by R. Haydock and others in Solid State Physics, vol.35 of 1980 tocomplemment the methods presented in the book.

As a scientist who went thru the rigors of getting a PhD in an American public university, I have noticed many subtle but inefficient practices. One of the worst goes as follows. A certain promising doctoral student starts on his (or her) research. His advisor hands him a classic text to read. Said text is nigh incomprehensible, but our prodigal student endeavors and comes to gradually understand the text and apply it to his studies. He graduates, begins his career and eventually gets that tenured position. Years later when he supervises his first graduate student, he imparts said text upon a new sufferer and the process begins anew. This book by W. A. Harrison is such a text. It is extremely hard to read, the words are small, there are few images or graphs or plots, and the examples are not geared for the computer age. But, because this book came out when solid state simulations began to spread in use and multiple free codes came about, it was read and used by many scientists and apprentices. Nowadays, there are dozens of much better books that are much easier to read and understand. Yet I still encounter this text being used. Why? Because many academics fought thru it, are proud of the feat, and somehow intend their trainees to do the same.I read this book after reading thru over a dozen other books in the same subject, and found this to be the hardest and least understandable. This book is often considered the Bible of electronic structure simulations. This is a correct statement in the worst sense possible because the number of people who understand the Bible is much less than those who swear by it; i.e. very similar to this book. Overall, I do not recommend buying it or reading it. Its only redeeming quality is the exhaustive number of equations.

of Monographs on Chemistry) Modern Quantum Chemistry: Introduction to Advanced Electronic Structure Theory (Dover Books on Chemistry) The Strategic Bond Investor: Strategies and Tools to Unlock the Power of the Bond Market Step by Step Bond Investing: A Beginner's Guide to the Best Investments and Safety in the Bond Market (Step by Step Investing Book 3) Step by Step Bond Investing - A Beginner's Guide to the Best Investments and Safety in the Bond Market: Step by Step Investing, Volume 3 The Bond Book, Third Edition: Everything Investors Need to Know About Treasuries, Municipals, GNMAs, Corporates, Zeros, Bond Funds, Money Market Funds, and More (Professional Finance & Investment) INKLINGS colouring book by Tanya Bond: Coloring book for adults & children, featuring 24 single sided fantasy art illustrations by Tanya Bond. In this ... & other charming creatures. (Volume 1) Blood Bond # 11 - Texas Gundown (Blood Bond (Graphic Audio)) Bond vs. Bond: The Many Faces of 007 The Bride's Broken Bond (Christian Romance): Sacred Bond Series Book 2 An Introduction to the Properties of Fluids and Solids Advances in Chemical Physics, Volume 15: Stochastic Processes in Chemical Physics (v. 15) Carbon Nanotubes: Advanced Topics in the Synthesis, Structure, Properties and Applications (Topics in Applied Physics)