



Biochemistry for Materials Science: Catalysts, Complexes and Proteins

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329 pages, \$150

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This book provides a comprehensive account of the fundamentals and developments in biochemistry and related materials science topics.

Combining elements of scientific reviews and science communication articles, the book addresses topics with technical accuracy and brevity. The content is introductory and provides references for further reading. Each chapter—and to an extent, each section—is self-sufficient and provides insight into the specific subject or example being discussed. The figures accompanying the text guide the discussion where necessary, such as on NMR spectra, chirality, synthesis schema, and mechanisms. The book does not have worked-out examples or homework problems.

Divided into five parts and 25 chapters, it covers the latest developments in the field (as of 2017), fundamentals of biochemistry, and case studies across disciplines ranging from life science to space.

Part One introduces the reader to recent research that has challenged long-held

scientific beliefs. The most notable are compounds formed by helium, which is a noble gas. Noble gases are elements that traditionally have been considered unreactive. Another example is the double helical structure found in inorganic molecules, which is seen mostly in DNA.

Part Two provides a formal introduction to biochemistry. This section discusses monomers and macromolecules (amino acids and proteins, and nucleic acids and DNA), and the structure, natural and chemical synthesis, and purification techniques. For materials scientists, this develops a base to understand the content that follows.

Part Three goes into detail about the use of materials and materials science concepts in biochemistry. Most chapters provide an introductory section to state the fundamentals necessary to understand the content. For instance, the chapter on chirality in space and in the brain starts with a note on chirality before discussing the findings. The discussion on mechanisms in chapters such as bioluminescence and on animal-related topics (specifically, on survival

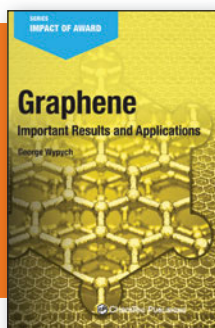
under anoxic conditions) makes the reader appreciate the underlying details.

Part Four discusses biochemistry at the interface of materials science and life science. The accounts of polymers used to increase the stability and thus shelf life of proteins, such as insulin, and use of myoglobin (a protein) as a catalyst for organic synthesis instead of transition metals seed ideas for sustainable innovation.

Part Five offers a mix of discussions on environmental sciences, the origins of life, and water on other planets. From the effects on agriculture because of ocean acidification to the possible hypothesis of the role of alkaline hydrothermal vents in initiating long chain polymerization of biomacromolecules, this section allows the reader to acknowledge the role of biochemistry and materials science across different scales.

The book is directed toward a reader with a background in materials science who wishes to gain an understanding of potential applications and research directions based on fundamentals and techniques of biochemistry. It could be used as a textbook for a senior-undergraduate or graduate-level seminar-like course in either biochemistry or materials science with additional readings from the references. This will enable the students acquainted with the fundamentals to develop a macro-understanding of the subject.

Reviewer: Somesh Mohapatra, Massachusetts Institute of Technology, USA.



Graphene: Important Results and Applications

George Wypych

ChemTec Publishing, 2019

315 pages, \$350.00

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Graphene, which made headlines throughout the scientific world after the 2010 Nobel Prize in Physics announcement, continues to inspire global researchers owing to its performance and multifunctionality. This book investigates

the impact of the prestigious award on graphene and related materials research and compiles all major areas of R&D documented thus far related to graphene. The book is divided into nine chapters. The first chapter outlines the pointers

to the merits of the Nobel, along with a brief narrative of the book.

The second chapter puts forward an analysis of the publications and patents in graphene research around the globe to showcase the impact the award has made toward the rapid development of graphene technology. Eleven production strategies for graphene, starting from the well-known chemical vapor deposition to nontraditional agricultural waste processing, are discussed as separate sections in Chapter 3.

Chapter 4 presents graphene market analysis, major manufacturers of graphene compounds, and a summary of the properties of commercial products. Chapter 5