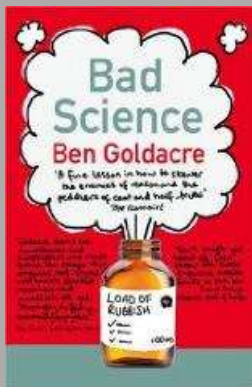


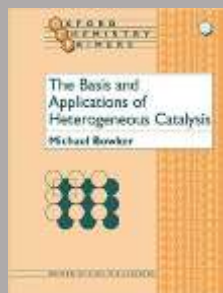
Chemistry Extended Reading List

Bad Science by Ben Goldacre



Full of spleen, this is a hilarious, invigorating and informative journey through the world of *Bad Science*. When Dr Ben Goldacre saw someone on daytime TV dipping her feet in an 'Aqua Detox' footbath, releasing her toxins into the water, turning it brown, he thought he'd try the same at home. 'Like some kind of Johnny Ball cum Witchfinder General', using his girlfriend's Barbie doll, he gently passed an electrical current through the warm salt water. It turned brown. In his words: 'before my very eyes, the world's first Detox Barbie was sat, with her feet in a pool of brown sludge, purged of a weekend's immorality.' Dr Ben Goldacre is the author of the *Bad Science* column in the *Guardian*. His book is about all the 'bad science' we are constantly bombarded with in the media and in advertising. At a time when science is used to prove everything and nothing, everyone has their own 'bad science' moments from the useless pie-chart on the back of cereal packets to the use of the word 'visibly' in cosmetics ads.

The Basis and Applications of Heterogeneous Catalysis by M Bowker



Catalysis is one of the most important technologies in our modern world. We depend on it to produce materials, such as plastics, from oil; we depend on it to produce fuel to power our cars; we depend on it to remove the pollutants emitted from the engines of those cars; we even depend on it for the functioning and growth of our own bodies. It is therefore very important that we ask ourselves the question, 'what is catalysis?' and this book does exactly that, concentrating on the most important type of catalysis for industry, namely heterogeneous catalysis. The book is split into 3 sections, dealing with the fundamentals of adsorption and reaction at surfaces, the nature of heterogeneous catalysts and their synthesis, and the applications of this technology in the modern world.

Big bang- a history of explosives by G I Brown



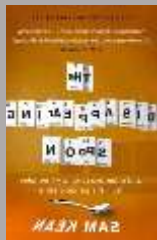
The tale of explosives from gunpowder to the H-bomb. Laying the emphasis on the lives of those involved, on the diverse uses of explosives and their social and historical impact, the author relates a story of international human endeavour.

The Chemistry of Life by Steve Rose



First published in 1966, *THE CHEMISTRY OF LIFE* has held its own as a clear and authoritative introduction to the world of biochemistry. This fourth edition has been fully updated and revised to include the latest developments in DNA and protein synthesis, cell regulation, and their social and medical implications.

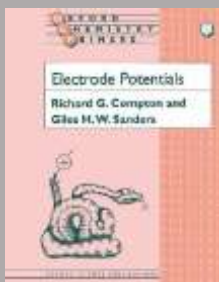
The Disappearing Spoon by Sam Kean



Why did Gandhi hate iodine (I, 53)? Why did the Japanese kill Godzilla with missiles made of cadmium (Cd, 48)? How did radium (Ra, 88) nearly ruin Marie Curie's reputation? And why did tellurium (Te, 52) lead to the most bizarre gold rush in history?

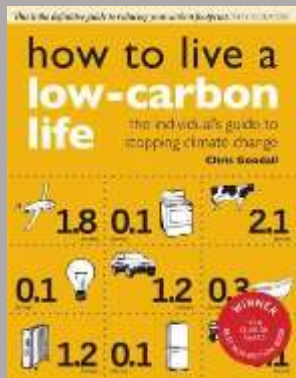
The periodic table is one of our crowning scientific achievements, but it's also a treasure trove of passion, adventure, betrayal and obsession. The fascinating tales in *The Disappearing Spoon* follow carbon, neon, silicon, gold and every single element on the table as they play out their parts in human history, finance, mythology, conflict, the arts, medicine and the lives of the (frequently) mad scientists who discovered them.

Electrode Potentials by Sanders Compton



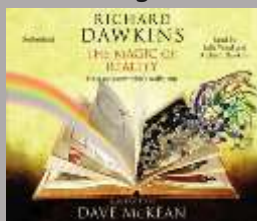
Offering a comprehensive introduction to equilibrium electrochemistry, this primer deals with electrode potentials and their applications. It builds on a knowledge of elementary thermodynamics, giving the reader an appreciation of the origin of electrode potentials and shows how these are used to deduce a wealth of chemically important information such as equilibrium constants, free energy, enthalpy and entropy changes of chemical reactions, activity coefficients, and the selective sensing of ions. The emphasis throughout is on understanding the foundations of the subject and how it may be used to study problems of chemical interest. The authors have minimized the mathematical aspects of the subject without any sacrifices in clarity, so as to enhance the accessibility of this volume.

How to Live a Low-Carbon Life by Chris Goodall



Climate change is the greatest challenge facing humanity: drastic reduction of carbon emissions is vital if we are to avoid a catastrophe that devastates large parts of the world. Governments and businesses have been slow to act and individuals now need to take the lead. The Earth can absorb no more than 3 tonnes of carbon dioxide emissions each year for every person on the planet if we are to keep temperature and rainfall change within tolerable limits. Yet from cars and holiday flights to household appliances and the food on our plates, Western consumer lifestyles leave each of us responsible for over 12 tonnes of carbon dioxide a year - four times what the Earth can handle. Individual action is essential if we want to avoid climate chaos. How to Live a Low-Carbon Life shows how easy it is to take responsibility, providing the first comprehensive, one-stop reference guide to calculating your CO₂ emissions and reducing them to a sustainable 3 tonnes a year.

The Magic of Reality: How we know what's really true by Richard Dawkins



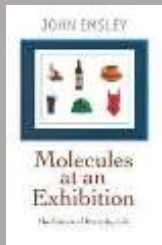
Packed with clever thought experiments, dazzling illustrations and jaw-dropping facts, *The Magic of Reality* explains a stunningly wide range of natural phenomena. What is stuff made of? How old is the universe? Why do the continents look like disconnected pieces of a puzzle? What causes tsunamis? Why are there so many kinds of plants and animals? Who was the first man, or woman? This is a page-turning, graphic detective story that not only mines all the sciences for its clues but primes the reader to think like a scientist as well.

Mechanisms of Organic Reactions by Howard Maskill



This concise, authoritative, and up-to-date overview begins with a chapter in which modern terminology, definitions, and concepts of mechanisms and reactivity are introduced. The following chapters provide accounts of the mechanisms of four of the main classes of reactions of aliphatic compounds. Rather than simply presenting the mechanisms to the reader, these chapters begin with experimental evidence and then demonstrate how this leads to the mechanistic deductions. Problems at the end of each chapter and a short bibliography further enhance this volume.

Molecules at an Exhibition by John Emsley



What ingredient in Coke can remove rust from chrome? What is the bitterest substance on earth? What is the worst smelling one? In this entertaining tour of chemistry, John Emsley answers these and many other questions as he illuminates the materials that make up our world. Dozens of lively articles explore such well-known molecules as water, oxygen, and glass; versatile plastics like polypropylene, polystyrene, and polyurethane; even "elements from hell" such as Sarin (a lethal nerve gas). With no formulas, equations, or molecular diagrams to baffle the non-expert, each piece blends history, science, and anecdote, with many intriguing facts added to the mix.

Napoleon's Buttons by Le Couteur & Burreson



This fascinating book tells the stories of seventeen molecules that, like the tin of those buttons, greatly influenced the course of history. These molecules provided the impetus for early exploration and made possible the ensuing voyages of discovery. They resulted in grand feats of engineering and spurred advances in medicine; lie behind changes in gender roles, in law, and in the environment; and have determined what we today eat, drink, and wear.

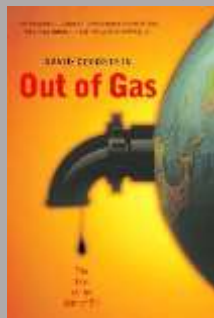
NMR: the Toolkit by P J Hore



This book provides a concise, approachable description of how modern NMR experiments work, aimed principally at those who use, or might use, an NMR spectrometer and are curious about why the spectra look the way they do. It provides, in an accessible and relatively informal fashion, the conceptual and theoretical tools needed to understand the inner workings of some of the most important multi-pulse, multi-nuclear, multi-dimensional techniques that chemists and biochemists use to probe the structures and dynamics of molecules in liquids. Part A (chapters 1-6) starts with the vector model, and proceeds to the more powerful product operator formalism. Part B (chapters 7-10) shows how straightforward quantum mechanics can be used to understand NMR and product operators at a more fundamental level.

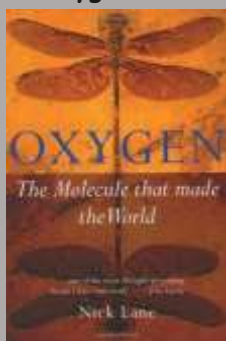
The treatment builds on material in P.J. Hore's OCP 32, Nuclear Magnetic Resonance, but it can also be used as a stand-alone text.

Out of Gas by David Goodstein



Our rate of oil discovery has reached its peak and will never be exceeded; rather, it is certain to decline—perhaps rapidly—forever forward. Meanwhile, over the past century, we have developed lifestyles firmly rooted in the promise of an endless, cheap supply. In this book, David Goodstein, professor of physics at Caltech, explains the underlying scientific principles of the inevitable fossil fuel shortage we face. He outlines the drastic effects a fossil fuel shortage will bring down on us. And he shows that there is an important silver lining to the need to switch to other sources of energy, for when we have burned up all the available oil, the earth's climate will have moved toward a truly life-threatening state. With its easy-to-grasp explanations of the science behind every aspect of our most urgent environmental policy decisions, *Out of Gas* is a handbook for the future of civilization.

Oxygen: the Molecule that made the World by Nick Lane



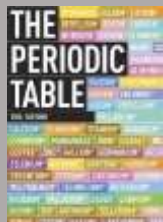
In *Oxygen*, Nick Lane takes the reader on an enthralling journey as he unravels the unexpected ways in which oxygen spurred the evolution of life and death. He shows how oxygen underpins the origin of biological complexity, the birth of photosynthesis, the sudden evolution of animals, the need for two sexes, the accelerated aging of cloned animals like Dolly the sheep, and the surprisingly long lives of bats and birds. Drawing on this grand evolutionary canvas, *Oxygen* offers fresh perspectives on our own lives and deaths, explaining modern killer diseases, why we age, and what we can do about it. Advancing revelatory new ideas, following chains of evidence, the book ranges through many disciplines, from environmental sciences to molecular medicine. The result is a captivating vision of contemporary science and a humane synthesis of our place in nature. This remarkable book will redefine the way we think about the world.

Periodic Tales: The Curious Lives of the Elements by Hugh Aldersey-Williams



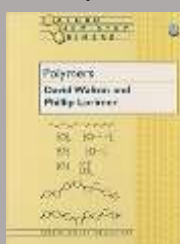
Periodic Tales by Hugh Aldersey-Williams, packed with fascinating stories and unexpected information about the building blocks of our universe. Everything in the universe is made of them, including you. Like you, the elements have personalities, attitudes, talents, shortcomings, stories rich with meaning.

Periodic Table: A Field Guide to the Elements by Paul Parsons



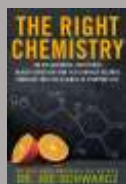
The *Periodic Table* looks at the fascinating story and surprising history of each of these elements, from the little-known uses of gold in medicine to that of arsenic as a wallpaper dye in the nineteenth-century and the development of the hydrogen bomb. Packed with interesting facts and figures and helpful illustrations, this accessible guide will help the armchair chemist navigate through the different groups of elements - and discover the world afresh.

Polymers by David J Walton and Phillip Walton



Here is the definitive introduction to polymer chemistry. This lively book takes the reader through the historical beginnings of polymers, the development of high-tonnage materials in the early part of the twentieth century, and on to the most modern high-performance materials available today. The authors are both experience educators and practitioners within the polymer industry and are uniquely qualified to discuss basic academic principles of polymers as well as their commercial application. Unlike other texts in this area, it successfully describes the exciting principles and varied applications that contribute to the use of plastics in every aspect of modern life.

The Right Chemistry by Schwarcz



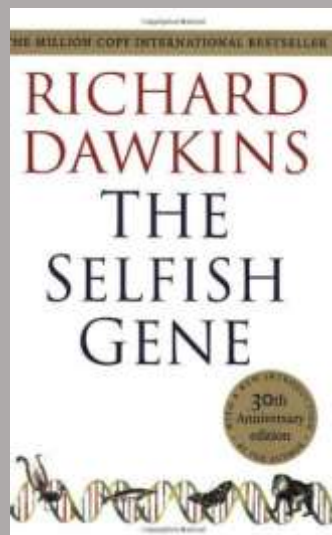
The director of McGill University's Office of Science and Society here brings his passion and immense knowledge to persuade readers that the pursuit of science is a source of wonder, enlightenment and well-being for everyone. He sets out to rescue chemistry from the bad rep it's developed in recent decades - there's more to it than toxins, pollution and E-numbers. Readers will learn whether beauty pills are worth taking, if baby shampoo is poisonous and discover (but not use!) the recipe for a Molotov cocktail.

Science, Money and Politics: Political Triumph and Ethical Erosion by Daniel S Greenberg



Each year, Congress appropriates billions of dollars for scientific research. In this book, veteran science reporter Daniel S. Greenberg takes us behind closed doors to show us who gets it, and why. What he reveals is startling: an overlooked world of false claims, pork, and cronyism, where science, money, and politics all manipulate one another.

The Selfish Gene by Richard Dawkins

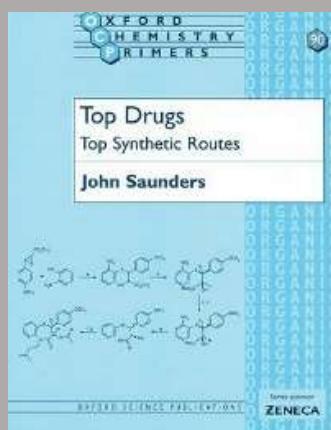


Inheriting the mantle of revolutionary biologist from Darwin, Watson, and Crick, Richard Dawkins forced an enormous change in the way we see ourselves and the world with the publication of *The Selfish Gene*. Suppose, instead of thinking about organisms using genes to reproduce themselves, as we had since Mendel's work was rediscovered, we turn it around and imagine that "our" genes build and maintain us in order to make more genes. That simple reversal seems to answer many puzzlers which had stumped scientists for years, and we haven't thought of evolution in the same way since.

Why are there miles and miles of "unused" DNA within each of our bodies? Why should a bee give up its own chance to reproduce to help raise her sisters and brothers? With a prophet's clarity, Dawkins told us the answers from the perspective of molecules competing for limited space and resources to produce more of their own kind. Drawing fascinating examples from every field of biology, he paved the way for a serious re-evaluation of evolution. He also introduced the concept of self-reproducing ideas, or memes, which (seemingly) use humans exclusively for their propagation. If we are puppets, he says, at least we can try to understand our strings.

By Rob Lightner

Top Drugs: Top Synthetic Routes by John Saunders



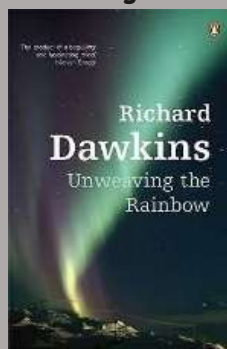
Today's top selling drugs have been uncovered from two major sources: natural products and laboratory synthesis. Those synthesised directly by medicinal chemists usually have been the result of a protracted discovery programme using a natural product (e.g. a hormone or an enzyme substrate) or a screening lead as a starting point. Many of the major categories of human disease cardiovascular, gastrointestinal, central nervous system, inflammatory and infectious diseases are included. After a short introduction to the discovery and mechanism of action of each drug, the syntheses of the best selling drugs are reviewed. Where the information exists in the literature, the original research method to each drug is compared with more recent approaches which aim either at improving the route or at validating newer methodologies or reagents in the context of drug synthesis. Since, for many drugs, the marketed product was originally prepared as a racemic mixture, perhaps the most important comparison is between that route and alternatives which involve some element of asymmetric synthesis.

Uncle Tungsten: Memories of a Chemical Boyhood by Oliver Sacks



In *Uncle Tungsten* Sacks evokes, with warmth and wit, his upbringing in wartime England. He tells of the large science-steeped family who fostered his early fascination with chemistry. There follow his years at boarding school where, though unhappy, he developed the intellectual curiosity that would shape his later life. And we hear of his return to London, an emotionally bereft ten-year-old who found solace in his passion for learning. *Uncle Tungsten* radiates all the delight and wonder of a boy's adventures, and is an unforgettable portrait of an extraordinary young mind.

Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder by Richard Dawkins



Did Newton "unweave the rainbow" by reducing it to its prismatic colours, as Keats contended? Did he, in other words, diminish beauty? Far from it, says acclaimed scientist Richard Dawkins; Newton's unweaving is the key to much of modern astronomy and to the breath-taking poetry of modern cosmology. Mysteries don't lose their poetry because they are solved: the solution often is more beautiful than the puzzle, uncovering deeper mysteries. With the wit, insight, and spellbinding prose that have made him a best-selling author, Dawkins takes up the most important and compelling topics in modern science, astronomy and genetics to language and virtual reality, combining them in a landmark statement of the human appetite for wonder.

This is the book Richard Dawkins was meant to write: a brilliant assessment of what science is (and isn't), a tribute to science not because it is useful but because it is uplifting.