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In 2020, you can look forward to more titles that cover emerging areas like biomaterials science and inorganic materials, and more additions to our new *Food Chemistry, Function and Analysis* series. The core disciplines are represented by works focusing on significant developments in analytical science, green chemistry, catalysis and detection science.

Continuing our collaboration with IUPAC, we will also be publishing the fourth edition of the *Compendium of Terminology in Analytical Science*, an abridged version of *Quantities. Units and Symbols in Physical Chemistry*, and the *Glossary of Terms Used in Molecular Toxicology*.

Books to enlighten

We are here to help everyone in the chemical sciences to do their best work and drive scientific progress. 2020 textbook topics include *Microfluidics and Lab-on-a-Chip, Controlled Drug Analysis* and *Conservation Science.*

In *Good Chemistry*, we provide a textbook that goes beyond experimental procedure, to help practising scientists develop the skills to recognise the ethical and social dimensions of their own work and act appropriately.

Books to inspire

Chemistry is at the centre of everything you can see, smell, touch and taste, so we will be adding to the books that show the chemistry in our lives. *Sticking Together, Discovering Cosmetic Science* and *Perfume in the Bible* are just a few examples of books to broaden your chemistry horizons that you can to look forward to in 2020.

If you have any queries, contact **books@rsc.org** to talk to the team.

For a list of books published prior to 2020, visit **rsc.li/backlist**

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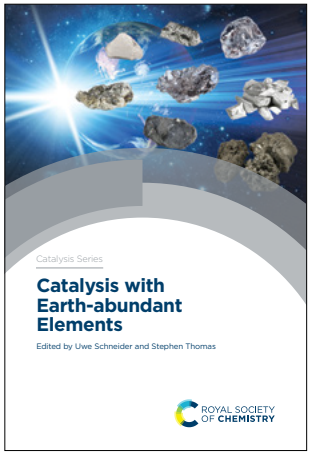

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Catalysis is a major area of scientific research covering numerous fields of chemistry, and is a key factor in tackling many of the scientific challenges faced today, such as renewable energy systems and environmental protection. The books in this series provide an accessible reference for postgraduates, academics and industrialists working in this exciting field. The books cover both the research developments and applications of catalysis, across academia and industry.

Carbon Nanomaterials in Hydrogenation Catalysis

Edward Furimsky IMAF Group, Canada

In the past decade numerous studies on the development of catalysts on carbon nano-supports have appeared in scientific literature and these have shown remarkable activity and specificity for hydrogenation reactions. Carbon Nanomaterial in Hydrogenation Catalysis is a valuable reference for researchers and chemical engineers working on improving hydrogenation processes or interested in applications for carbon nanomaterials. Covering their production, modification and applications as a catalyst support this book provides an in-depth review of the current state-of-the art in using carbon nanomaterials for hydrogenation.

Hardback | 201 pages | 9781788017237 | 2019 | £149.00 | $205.00

ISBN 978-1-78801-723-7

Catalysis with Earth-abundant Elements

Uwe Schneider University of Edinburgh, UK | **Stephen Thomas** University of Edinburgh, UK

Catalysis remains a key technology in the 21st century. Considering the limited resources of our planet, earth-abundant elements will have to be explored increasingly in the future. The aim of this book is to highlight the use of the most earth-abundant elements in various types of catalysis and will be of interest to graduates, academic researchers and practitioners in catalysis.

Hardback | 350 pages | 9781788011181 | 2020 | £169.00 | $235.00

ISBN 978-1-78801-118-1

Catalytic Aerobic Oxidations

Esteban Mejía Leibniz Institute for Catalysis (LIKAT), Germany

Catalytic reactions that are selective and efficient and allow the replacement of common stoichiometric oxidants with molecular oxygen from air at atmospheric pressure provide higher atom efficiency and water as the only side product. Focusing on the use of molecular oxygen as the terminal oxidant this book covers recent advances in the "taming" of the highly reactive oxygen gas by use of micro-flow reactors and membranes.

Hardback | 350 pages | 9781788017206 | 2020 | £169.00 | $235.00

ISBN 978-1-78801-720-6

Vanadium Catalysis

Manas Sutradhar University of Lisbon, Portugal | **Armando J L Pombeiro** University of Lisbon, Portugal | **José Armando L da Silva** University of Lisbon, Portugal

Vanadium is one of the more abundant elements in the earth's crust making it a more sustainable and more economical choice as a catalyst than many of the noble metals. A wide variety of reactions have been found to be catalysed by both homogeneous and supported vanadium complexes. This book brings together the research on the catalytic uses of this element into one essential resource. Including theoretical perspectives on proposed mechanisms for vanadium catalysis and an overview of its relevance in biological processes.

Hardback | 450 pages | 9781788018579 | 2020 | £179.00 | $250.00

ISBN 978-1-78801-857-9

About the series

1359-6640

Faraday Discussions covers a variety of topics in rapidly developing areas of the physical sciences, with a focus on physical chemistry and its interfaces with other scientific disciplines. The journal publishes the papers presented and a record of the questions, discussion and debate that took place at the corresponding Faraday Discussions meeting and provides an important record of current international knowledge and opinions in the relevant field. Each Faraday Discussion covers a topic in a rapidly developing area of chemistry, and will be of interest to academic and industrial chemists across all areas of the chemical sciences.

Chemistry of 2-Dimensional Materials

Beyond Graphene

Graphene has extraordinary chemical and physical properties ensuring its use in opto-electronics, energy and biomedical applications. One of the greatest challenges is to develop and master chemical strategies for other 2D materials such as transition metal dichalcogenides. This Faraday Discussion covers all areas related to other 2D materials' chemistry spanning from their theoretical/computational prediction to their synthesis and functionalization yielding 2D and 3D systems with tailor made physical properties for a wide range of applications.

Hardback | 450 pages | 9781788019118 | 2020 | £170.00 | $235.00

ISBN 978-1-78801-911-8

Cooperative Phenomena in Framework Materials

There has been exponential growth in the number of nanoporous framework materials reported in the scientific literature over recent years. These novel families of materials open up new horizons in practically all branches of engineering, physics, chemistry, biology, and medicine. With their numerous applications as selective adsorbents and catalysts, substrates for biosensors and drug delivery, membranes and films in various nanotechnologies this Faraday Discussion discusses both the fundamentals and the applied aspects of framework materials.

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Luminescent Silicon Nanostructures

Silicon is the most important semiconducting material of the microelectronic industry. Bulk silicon does not exhibit good optical properties, however in the late 1980s good emission was observed in porous silicon. Since then, a variety of luminescent silicon nanostructures have been investigated, but the origin of this luminescence is debated in the literature. This Faraday Discussion explores new methodologies to synthesize and characterise luminescent silicon nanostructures, from porous silicon to nanocrystals and nanorods.

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Mechanistic Processes in Organometallic Chemistry

Organometallic chemistry underpins the majority of homogeneous catalysis. Mechanistic investigations have played a key role in the field of organometallic chemistry since its early days and there have been many significant developments recently in the physical methods that can be used to gain mechanistic understanding in organometallic chemistry. This Faraday Discussion focuses on mechanistic studies coupled with novel experimental and computational methods, bringing together experts with a wide range of interests and backgrounds, including those developing new physical methods for mechanistic investigations and potential end users of these methods.

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New Horizons in Density Functional Theory

Density functional theory (DFT) is today's most widely used method for practical computational electronic structure calculations across chemistry, physics and materials science. Fuelled by a rapid increase in computational power and the advent of linear scaling technologies the systems to which DFT may be applied have become ever larger, more complex. This Faraday Discussion brings together chemists, physicists, materials scientists and applied mathematicians who develop new density-functional methods and rely on this approach as a key tool in their research.

Hardback | 450 pages |9781788019132 | 2020 | £170.00 | $235.00

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Peptide-membrane Interactions

It is difficult to overstate the importance of improving our understanding of how macromolecules interact with membranes as this is a fundamental aspect of how living systems operate. These processes are involved in protein folding, cell signalling, biogenesis, morphogenesis, disease and medical therapy. This Discussion addresses several related aspects of peptide interactions with membranes, discussing model theoretical and experimental systems in order to define the 'reaction space' that is possible and how this applies to fundamental questions in cell biology.

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Quantum Effects in Complex Systems

Nuclear quantum effects such as zero-point energy conservation, tunnelling, non-adiabaticity and coherence play an important role in many complex chemical systems of technological and biological importance. This Faraday Discussion brings together both computational and experimental researchers who are interested in developing and applying methods that can be used to understand the role of quantum effects in complex systems. This volume provides a useful resource for researchers focussed on “many-particle” systems, including liquids, solids, biological complexes, and nanoparticles.

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Reaction Mechanisms in Catalysis

Heterogeneous catalysis is a core area of contemporary physical chemistry posing major fundamental and conceptual challenges. It lies at the heart of the chemical industry - an immensely successful and important part of the overall UK economy, and catalysis plays a crucial part in the production of 80% of all manufactured goods. This Faraday Discussion discusses key aspects of reaction mechanism studies and how this can drive rational design of catalysts.

Hardback | 450 pages | 9781788019095 | 2020 | £170.00 | $235.00

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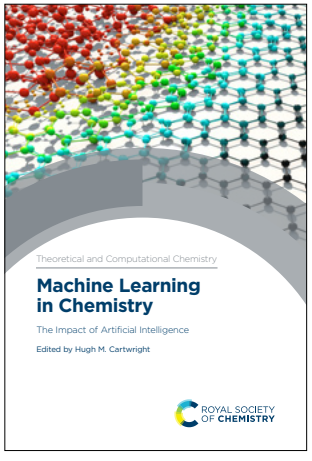

About the series

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Editor-in-chief

Jonathan Hirst University of Nottingham, UK

Covering all aspects of theoretical and computational chemistry, from current theoretical methods and techniques to new developments in emerging areas, this series comprises up-to-date and timely references for postgraduate students and practising chemists. Books in the series cover both the methodologies at the core of the discipline and applications at the interface with physics, materials, computer science, biological and life sciences. They provide timely, in-depth treatments at the frontiers of theoretical and computational chemistry.

Computational Techniques for Analytical Chemistry and Bioanalysis

Philippe B Wilson De Montfort University, UK | **Martin Grootveld** De Montfort University, UK

As analysis in chemical and biological fields has developed so computational techniques have advanced enabling greater understanding of the data. This work will serve as a definitive overview of the field of computational simulation as applied to analytical chemistry and biology, drawing on recent advances as well as describing essential, established theory. Computational approaches provide additional depth to biochemical problems, as well as offering alternative explanations to atomic scale phenomena. Highlighting the innovative and wide-ranging breakthroughs made by leaders in computational spectrum prediction and the application of computational methodologies to analytical science, this book is for graduates and postgraduate researchers showing how computational analytical methods have become accessible across disciplines.

Hardback | 500 pages | 9781788014618 | 2020 | £179.00 | $250.00

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London Dispersion Forces in Molecules, Solids and Nano-structures

An Introduction to Physical Models and Computational Methods

Janos Angyan University of Lorraine, France | **John Dobson** Griffith University, Australia | **Georg Jansen** University of Duisburg-Essen, Germany | **Tim Gould** Griffith University, Australia

Summarising current understanding of the physical origin and modelling of London dispersion forces manifested at an atomic level, this book provides theoretical, physical and synthetic chemists, as well as solid-state physicists, with a systematic understanding of the origins and consequences of these ubiquitous interactions. It covers a wide range of systems, from small intermolecular complexes, to organic molecules and crystalline solids, through to biological macromolecules and nanostructures.

Hardback | 450 pages | 9781782620457 | 2020 | £179.00 | $250.00

ISBN 978-1-78262-045-7

Machine Learning in Chemistry

The Impact of Artificial Intelligence

Hugh M Cartwright

There is a growing consensus that machine learning (ML) has the potential to develop into a tool that is almost as fundamental in scientific research as computers themselves. With contributions from leading research groups, this book presents in-depth examples of the application of ML to real chemical problems. Through these examples, readers who are intrigued by the power of this technique can gain a feel for its potential and discover how it might be applied in their own field.

Hardback | 450 pages | 9781788017893 | 2020 | £179.00 | $250.00

ISBN 978-1-78801-789-3

Tunnelling in Molecules

Johannes Kästner University of Stuttgart, Germany | **Sebastian Kozuch** Ben-Gurion University of the Negev, Isreal

There has been a lot of progress in the field of quantum tunnelling in the last few decades yet there are no books on its applications in chemistry that are less than a decade old. Including theoretical and experimental chapters, from the physical chemistry to the biochemistry fields this new book provides a broad and conceptual perspective of the reactivity of molecules based on quantum mechanical tunnelling.

Hardback | 300 pages | 9781788018708 | 2020 | £159.00 | $220.00

ISBN 978-1-78801-870-8

Understanding Hydrogen Bonds

Slawomir Grabowski University of the Basque Country and Donostia International Physics Center (DIPC), Spain

The area of hydrogen bonding is one that is well studied but our understanding continues to develop as the power of both computational and experimental techniques has improved. This book presents an up-to-date overview of our theoretical and experimental understanding of the hydrogen bond. It covers both well-established and novel approaches, new types of interaction that might be classified as hydrogen bonds and a comparison of hydrogen bonds to other types of non-covalent interactions.

Hardback | 450 pages | 9781788014793 | 2020 | £179.00 | $250.00

ISBN 978-1-78801-479-3

Catalysis

Volume 32

James Spivey Louisiana State University, USA | **Yi-Fan Han** East China University of Science and Technology, China | **Dushyant Shekhawat** National Energy Technology Laboratory, USA

Catalysts are required for a variety of applications and researchers are increasingly challenged to find cost effective and environmentally benign catalysts to use. This volume looks at modern approaches to catalysis and reviews the extensive literature including metal-support interactions of Ru-based catalysts under conditions of CO and CO2 hydrogenation, electrocatalytic applications of heteroatom-doped carbon nanostructures and catalytic decomposition of gas-phase benzene.

Hardback | 300 pages | 9781788017749 | 2020 | £314.95 | $440.00

ISBN 978-1-78801-774-9

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Determining Stability Constants

A Handbook

Pall Thordarson University of New South Wales, Australia

Determining binding constants is a fundamental component of experimental chemistry research. This book provides an up-to-date overview of the most powerful experimental methods and software tools available, and systematically catalogues the main methods and useful information regarding the determination of stability constants in supramolecular chemistry, ranging from simple host–guest equilibria to complex cooperative assemblies. Written by an expert in the field, this title will be an important resource for students and researchers working in supramolecular chemistry, inorganic chemistry and drug delivery.

Hardback | 400 pages | 9781788011655 | 2020 | £125.00 | $175.00

ISBN 978-1-78801-165-5

Optimal Experimental Design for Chemical Engineers

Federico Galvanin University College London, UK

Model building procedures have been proposed for developing, improving and validating mechanistic models in more efficient ways by managing and guiding the information obtained from experimental activities. These procedures heavily rely on the use of efficient computational techniques for model identification based on the use of optimal design of experiments techniques. This book guides the reader through statistical tools and methods for building mechanistic mathematical models in chemical engineering using design of experiment techniques. Relevant chemical engineering case studies are used throughout the book to provide a practical approach to this complex topic. Ideal for experimenters, who will find useful tips for driving experiments, and modellers who will find useful information on model development, selection and validation, this book is essential for chemical engineers across academia and industry.

Hardback | 450 pages | 9781788010870 | 2020 | £179.00 | $250.00

ISBN 978-1-78801-087-0

Quantities, Units and Symbols in Physical Chemistry

Abridged Version 2019

E Richard Cohen | **Tom Cvitas** University of Zagreb | **Jeremy G Frey** University of Southampton | **Bertil Holström** | **Kozo Kuchitsu** Tokyo University of Agriculture | **Roberto Marquardt** Université Louis Pasteur | **Ian Mills** University of Reading | **Franco Pavese** Instituto Nazionale di Ricerca Metrologica | **Martin Quack** Laboratorium für Physikalische Chemie der ETH Zürich | **Jüergen Stohner** Zürich University of Applied Sciences | **Herbert L Strauss** University of California at Berkeley | **Michio Takami** | **Anders J Thor** SIS Swedish Standards Institute

Prepared by the IUPAC Physical Chemistry Division this abridged version of the definitive manual is designed to improve the exchange of scientific information among the readers in different disciplines and across different nations. This book has been systematically brought up to date to reflect the increasing volume of scientific literature and terminology and aims to provide a helpful guide to the widely used terms and symbols together with understandable definitions and explanations of best practice. It echoes the experience of the contributors with the previous editions and the comments and feedback have been integrated into this essential resource.

Paperback | 120 pages | 9781839161506 | 2020 | £30.99 | $42.99

ISBN 978-1-83916-150-6

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