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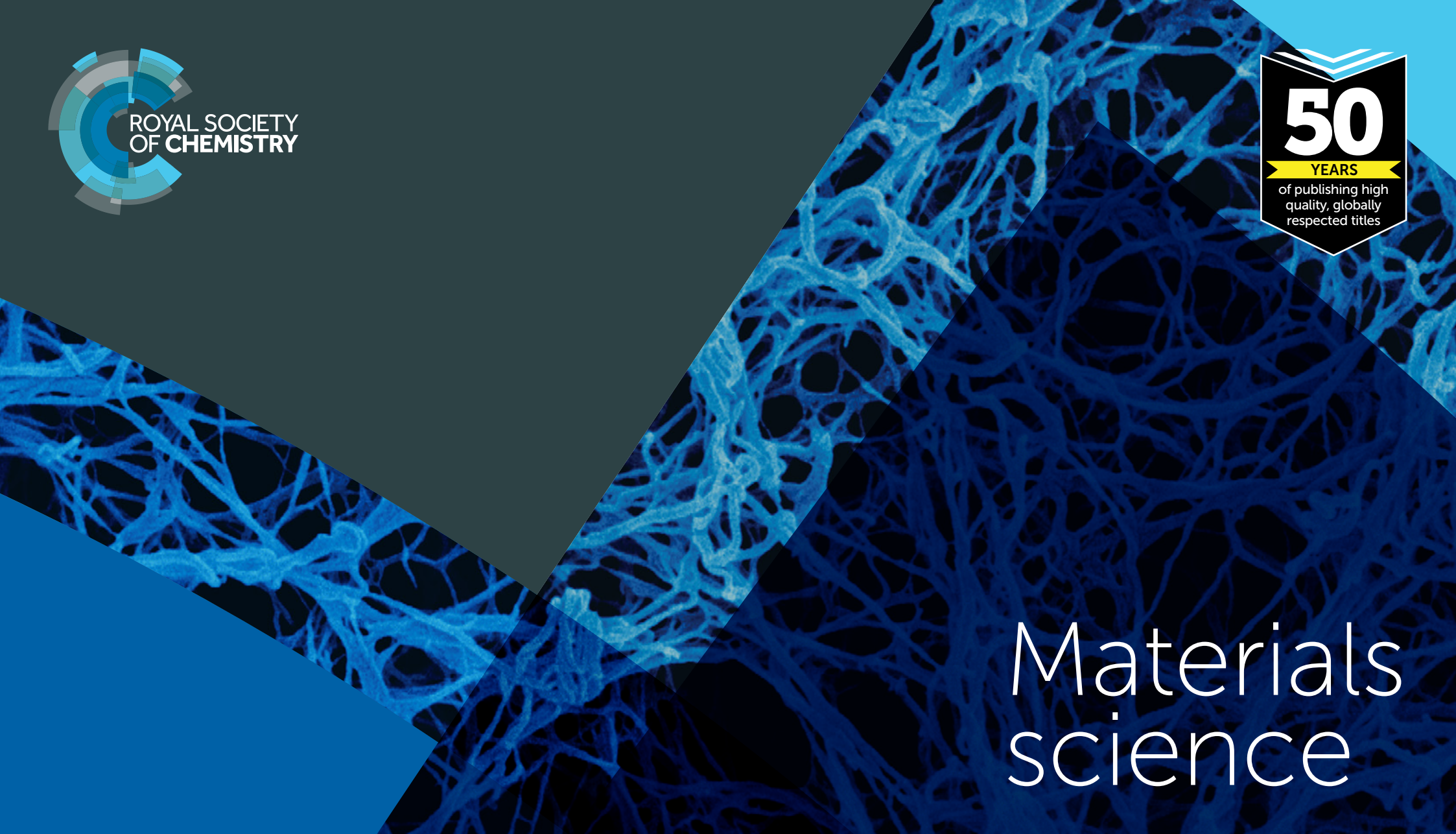

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Five minutes with...

Name Simon Hall

Affiliation University of Bristol, UK

Editor of *Bioinspired Inorganic Materials*

Book publication date July 2019

ISBN 9781788011464

Tell us about your book
Bioinspired Inorganic Materials will provide up-to-date reviews of research in the area of bioinspired inorganic materials, with some historical context. The emphasis is on how bioinspiration is being used for cutting-edge applications. This book will provide undergraduates, postgraduates and other researchers convenient and accessible introductions to these topics.

What do you think will be the next big breakthrough in your subject area?
There is virtually no field of scientific endeavour that has not felt the touch of the 'bioinspired' ethos and that is reflected in this book. In particular, big breakthroughs are coming for energy applications such as in batteries and artificial photosynthesis and also in bioinspired materials for regenerative medicine such as hydrophobic glues and self-healing structures.

Looking back what is the biggest development in your area of research?
In my opinion, it was the publication of the book On Growth and Form by D'Arcy Wentworth Thompson in 1917 that irrevocably changed the way biological structures were considered. Up to that point, there was a view that natural structures formed because of some 'vital' force. On Growth and Form however considered biological structures to be a consequence of the physical behaviour of matter, such as surface tension and compartmentalisation. Once this was realised, it was a logical step to use knowledge of the physics and chemistry of materials to replicate natural structures in the laboratory in a biomimetic way.

What was the biggest challenge you faced when editing the book?
The biggest challenge was deciding which of the multitude of fields using bioinspiration should be included in the book. I feel that by focussing the book on the use of bioinspiration in the creation of materials for technologies with the largest societal impact, this challenge was met and met well.

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Five minutes with...

Name Richard I Walton

Affiliation University of Warwick, UK

Editor of *Inorganic Materials series*

Tell us about the series

The *Inorganic Materials* series provides up-to-date reviews of topical and emerging areas of research in the broad field of functional materials. This is a fast-moving field that is driven by applications in many important and diverse technologies, such as electronic devices, energy storage, environmental clean-up and biomedicine. Our aim is to provide accessible introductions to contemporary topics for all researchers, from final-year undergraduate students upwards. We purposely chose the series title *Inorganic Materials* to emphasise that the subject covers chemical elements from all parts of the Periodic Table and is by no means limited to one subset of materials. In fact, the volumes highlight the interfaces of chemistry with other disciplines, ranging from physics and biosciences to medicine and electronics. We not only cover properties of materials but highlight their structures, their synthesis and methods for their study.

What do you think will be the next big breakthrough in your subject area?

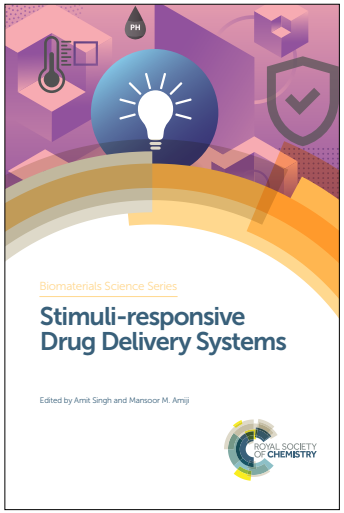
This is difficult to predict, given the huge scope of the subject, but what is particularly exciting is the rapid development of experimental methods for studying the structures of materials – not only under static conditions, but also reactive conditions and during their synthesis. Coupled with advances in computational methods for predicting new structures, the pace of discovery of new functional materials is rapidly increasing so the possibility of new substances with targeted properties suited for application could well become a reality.

What is the future looking like for Inorganic materials?

The potential of the subject is tremendous, especially given the current demands for high-performance materials for applications in energy and the environment. This includes batteries, fuel cells and solar devices for the capture and degradation of pollutants. These are well-publicised topics whose importance is globally recognised and for which innovative chemistry is needed. These demands are not likely to go away with increasing a global population, diminishing natural resources and climate changes. Although it is impossible to predict exactly which materials and properties will be required, there is no doubt the topic will continue to grow over the coming years.

How did you get into your field?

My first research project as a final year undergraduate at Oxford was in solid-state chemistry, studying the synthesis and structures of zeolite-type phosphates using organic templates. This not only led to the discovery of new structures but provided excellent training in the combination of materials synthesis and structural characterisation. That training was further developed in subsequent projects on amorphous chalcogenides during my PhD and then in using *in situ* methods for following crystallisation in solvothermal reactors back in Oxford. It was the mixture of synthesis, structural characterisation and property measurement that is involved in solid-state chemistry that appealed to me, and it led me to my current work in synthesis of materials with properties and applications guided via industrial collaboration.



About the series

2397-1401

Editor-in-chief
Julian Jones Imperial College London, UK

Series editors
Changyou Gao Zhejiang University, China | **Cole DeForest** University of Washington, USA

Addressing the hottest topics in biomaterials science, these authoritative texts provide in-depth overviews and analysis for graduates, academics and practitioners requiring a deeper understanding of the subject. Emphasising a physical science and engineering approach, titles address physicochemical properties and structure-property relationships to inform function and design. Capturing underpinning principles applied to biomaterials science, as well as emerging technological advances and applications, this series is a high quality resource for those studying and conducting research in biomaterials science and engineering.

Antimicrobial Materials for Biomedical Applications

Avi Domb Hebrew University of Jerusalem, Israel | **Konda Reddy** Kunduru University of Hyderabad, India

With the need to combat emerging infectious diseases, research around antimicrobial biomaterials and their applications is booming. This book provides the field with a much-needed fundamental overview of the science, addressing the chemistry of a broad range of biomaterial types, and their applications in the biomedical industry. Materials covered include polymers, from those with inherent antimicrobial activity to those which release antimicrobial agents, antimicrobial ceramics and inorganic compounds, such as metal based antimicrobial additives, and the developing field of biomimetic materials, are discussed. Surfaces, coatings and adhesives are covered, whilst the applications of these antimicrobial materials in biomedical applications, from catheters to orthopaedics, dentistry to ophthalmology, are explored.

Hardback | 400 pages | 9781788011884 | 2019 | £179.00 | $250.00

ISBN 978-1-78801-188-4
9 781788 011884

Biomaterial Control of Therapeutic Stem Cells

Akon Higuchi National Central University, Taiwan

Covering both human embryonic stem cells (hESCs) and human induced pluripotent stem cells (hiPSCs), this book bridges the gap between biomaterials research of stem cells and their use in clinical trials. The differentiation of human pluipotent stem cells (hPSCs) can be regulated by biological and physical cues from the biomaterials they are cultured on. This book provides a systematic treatment of stem cell culture and differentiation on specific biomaterials covering: 2D and 3D culture of hPSCs; differentiation of stem cells into cardiomyocytes, osetoblasts, neural lineages and hepatocytes; and biomaterials for clinical trials of stem cell therapies. A closing chapter looks at future trends. Written by an international leader in the field, this book is suitable for researchers working in biomaterials science, bioengineering, regenerative medicine and drug design.

Hardback | 250 pages | 9781788012072 | 2019 | £149.00 | $205.00

ISBN 978-1-78801-207-2
9 781788 012072

Decellularized Extracellular Matrix

Characterization, Fabrication and Applications

Takashi Hoshiba University of Yamagata, Japan | **Tetsuji Yamaoka** National Cerebral and Cardiovascular Center Research Institute, Japan

Takashi Hoshiba and Tetsuji Yamaoka have brought together, for the first time, leading contributors to provide a fundamental guide to the decellularized extracelluar matrix. Focussing on the sources of dECM, preparation, characterization and applications of dECM in regenerative medicine and biological systems, this is a must-have resource for those working in regenerative medicine and tissue engineering.

Hardback | 325 pages | 9781788014670 | 2020 | £159.00 | $220.00

ISBN 978-1-78801-467-0

The Chemistry of Medical and Dental Materials

2nd Edition

John Nicholson Bluefield Centre for Biomaterials Ltd, UK and Queen Mary University of London, UK

Since the first edition of The Chemistry of Medical and Dental Materials was published (2002), the field has moved on apace. This new edition is a thorough update by one of the pioneers of the field. A new chapter on ethical perspectives has been added, with updates to all other chapters to include developments on nanotechnology, advancements in our understanding of biocompatibility and improvements in materials science for drug delivery and clinical use.

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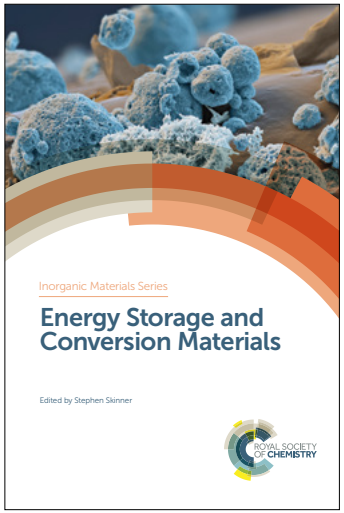

About the series

ISSN: 2472-3819

Series editors
Duncan W Bruce University of York, UK |
Dermot O'Hare University of Oxford, UK |
Richard I Walton University of Warwick, UK

This new series will provide authoritative coverage of topical and emerging research areas in inorganic materials chemistry and its related disciplines in physics, biology and materials science. The series will cover the three key areas of materials class, function and methodology, with each volume themed around a specific type of material, characterisation method, preparation technique or application. The books are written at a level accessible to advanced undergraduates, postgraduates and researchers wishing to learn about the subject

Bioinspired Inorganic Materials

Structure and Function

Simon R Hall University of Bristol, UK

This book showcases recent developments in inorganic biomaterials in an area of societal interest and importance. It covers areas such as functional surfaces, energy storage and metamaterials, with an emphasis on how inorganic biomaterials are being used for cutting-edge applications. With chapters written by expert researchers in their fields, Bioinspired Inorganic Materials will provide undergraduates, postgraduates and other researchers convenient and accessible introductions to these topics.

Hardback | 350 pages | 9781788011464 | 2019 | £99.99 | $140.00

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Energy Storage and Conversion Materials

Stephen Skinner Imperial College London, UK

Showcasing recent developments in inorganic materials in an area of societal interest and importance, this book provides an up-to-date introduction to the contemporary use of functional solids in emerging technologies. Energy Storage and Conversion Materials describes the application of inorganic materials in the storage and conversion of energy, with an emphasis on how solid-state chemistry allows development of new functional solids for energy applications. Edited and written by world-renowned scientists, this book will provide a comprehensive introduction for advanced undergraduates, postgraduates and researchers wishing to learn about the topic.

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Solar Energy Capture Materials

Elizabeth A Gibson Newcastle University, UK

This volume covers the use of inorganic materials for Solar Energy Capture, with an emphasis on how solid-state chemistry allows development of new functional solids for energy applications. Chapters include: silicon-based photovoltaic devices; compound semiconductor-based solar cells; photoelectrochemical solar cells; solution processed solar cells and photon management/tandem solar cells.

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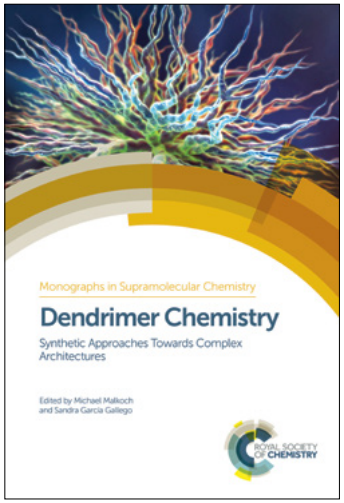

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ISSN: 1368-8642

Series editors
Jonathan Steed Durham University, UK | **Philip Gale** The University of Sydney, Australia,

Supramolecular chemistry concerns the structure and function of molecular assemblies formed through weak interactions. These complexes have found diverse applications in materials chemistry, nanoscience, catalysis, food sciences, and medicine, and this has led to a rapid expansion in supramolecular chemistry research. With contributions from high profile international scientists working within the field, each book in the series covers a key concept for graduate level students and above interested in supramolecular chemistry and its diverse applications. The books are ideal for reference and as state-of-the art guides, and they aim to enable further developments of new applications through an understanding of the fundamentals and a comprehensive overview of the latest research.

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Simon R Hall University of Bristol, UK

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Dendrimer Chemistry

Synthetic Approaches Towards Complex Architectures

Michael Malkoch KTH Royal Institute of Technology, Sweden | **Sandra García Gallego** KTH Royal Institute of Technology, Sweden

The dendrimer field continues to grow due to the unique structure of dendrimers that lends itself to useful properties and applications, such as in drug delivery. This book covers the latest advances in the synthesis of dendrimers and other complex dendritic architectures. It provides an overview of the most established building blocks for each family of dendritic material, and highlights the synthetic and structural trends and new applications. This will be a handy reference for postgraduate students and researchers in organic chemistry, polymer chemistry, (nano) materials science and macromolecular chemistry.

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Structure and Dynamics in Solid-state Inclusion Compounds

Leonard J Barbour Stellenbosch University, South Africa | **Luigi R Nassimbeni** University of Cape Town, South Africa

Recent advances in structural methods and in-situ techniques have greatly facilitated the elucidation of crystal and molecular structures. Concurrent advances have also occurred in the development of complementary techniques. This book describes the methods used to elucidate structure-property relationships of solid-state inclusion compounds. In particular, it focuses strongly on structural chemistry and the physical methods used to determine bulk properties. Written by world leaders in the field, this title will appeal to students and researchers working in solid-state organic chemistry, crystal engineering and supramolecular chemistry.

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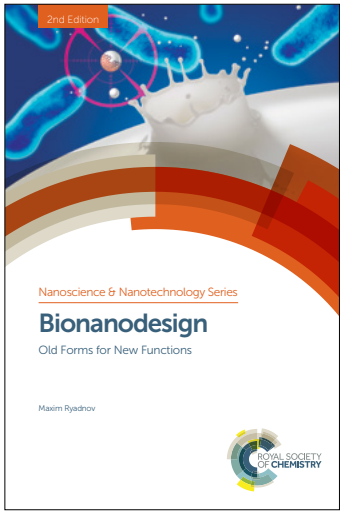
Supramolecular Chemistry in Biomedical Imaging

Stephen Faulkner University of Oxford, UK | **Thorfinnur Gunnlaugsson** Trinity College Dublin, Ireland | **Gearóid Ó Máille** Trinity College Dublin, Ireland

There have been great advances in biomedical imaging techniques in recent years and they are becoming prominent in supramolecular chemistry. This book will clarify the current understanding of these techniques. This publication caters for academics coming to the field from mainstream supramolecular chemistry and graduate students interested in supramolecular chemistry, imaging agents and imaging techniques for biomedical applications.

Hardback | 300 pages | 9781782622970 | 2019 | £159.00 | $220.00



About the series

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The possible uses of nanotechnology span many fields from energy to health; as a result there is a wealth of scientific nanoscience research taking place all over the world. When there is so much information available on the topic, it can be difficult to get a complete overview of the latest developments. The Nanoscience and Nanotechnology Series provides a comprehensive resource of books covering key topics such as the characterisation, performance and properties of nanostructured materials and technologies and their applications. With contributions from leading experts in nanoscale research, the books are suitable for graduate student level and above in chemistry, materials science, engineering, biology and physics wanting to know more about nanoscience.

Bionanodesign

Old Forms for New Functions

2nd Edition

Maxim Ryadnov National Physical Laboratory, UK

Bionanodesign has been fully revised and updated to bring together contemporary approaches for designing nanostructures that employ naturally derived self-assembling motifs as synthetic platforms. The overall aim is to compile the existing understanding of rules that govern biomolecular self-assembly into a practical guide to molecular nanotechnology. Written by a world recognised expert, this book provides an authorative guide to those working in design and development of nanomaterial research in industry and academia, from postgraduate researcher upwards.

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Surface Chemistry of Colloidal Nanocrystals

Ana Luísa Daniel-da-Silva University of Aveiro, Portugal | **Tito Trindade** University of Aveiro, Portugal

The chemistry of nanomaterials has developed considerably in the past two decades. This book provides insights on the chemistry of inorganic nanoparticles of colloidal nature. Surface Chemistry of Colloidal Nanocrystals will provide fundamentals on the topic for a broad audience as well as information on the chemical modification of surfaces of several different nanocrystal systems. Written by prestigious scientists, this book will be a useful resource for students and researchers working in surface science, nanoscience and materials science as well as those interested in the applications of the nanomaterials.

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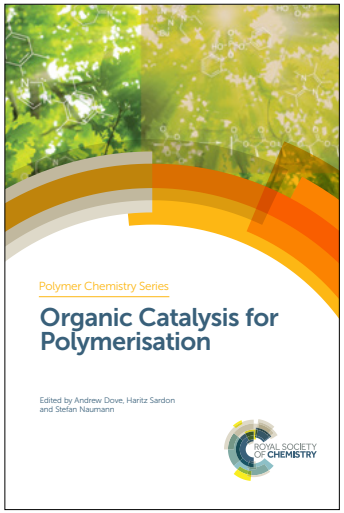

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Costas S Patrickios University of Cyprus, Cyprus

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Andrew Dove University of Birmingham, UK | **Haritz Sardon** University of the Basque Country UPV/EHU, Spain | **Stefan Naumann** University of Stuttgart, Germany

In recent years polymerisation using organocatalysts has become an appealing alternative to more traditional metal-based catalysts. This book provides a complimentary view of the field, with both an overview of state-of-the-art catalyst development as well as the best methodologies available to create specific polymer types. Edited by leading figures in the field, this title will serve as an excellent reference for postgraduate students and researchers in both academia and industry interested in polymer chemistry, organic chemistry, catalysis and materials science.

Hardback | 600 pages | 9781788011846 | 2019 | £199.00 | $275.00

ISBN 978-1-78801-184-6

Synthetic Polymer Chemistry

Innovations and Outlook

Ben Zhong Tang The Hong Kong University of Science and Technology, Hong Kong | **Anjun Qin** South China University of Technology, China | **Zheng Zhao** The Hong Kong University of Science & Technology, Hong Kong | **Rong Hu** South China University of Technology, China

The increasing demand for polymers with new structures and functions has inspired the development of new synthetic techniques. This book focuses on breakthroughs and progress in synthetic polymer chemistry, providing efficient tools for the synthesis of linear and topological polymers. Synthetic Polymer Chemistry will be a valuable reference for those working in polymer chemistry, as well as students and researchers interested in opto-electronic, biological and materials sciences.

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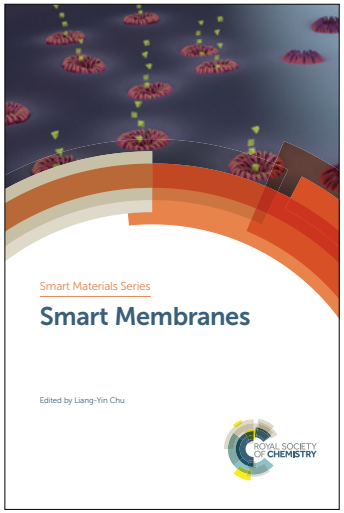

About the series

ISSN: 2046-0066

Series editors

Hans-Jörg Schneider Universität des Saarlandes, Germany | **Mohsen Shahinpoor** University of Maine, USA

The progress of new functional materials plays a vital role in solving many of today's global challenges, from energy and sustainability to medicine and healthcare. With a wealth of information available it's hard to find a resource providing a complete overview of the different types of smart materials available. Each book in the series covers the fundamentals and applications of different material system from renowned international experts. Stay in the know with the Smart Materials Series - the intelligent way to find your materials solution.

Cucurbituril-based Functional Materials

Dönüs Tuncel Bilkent University, Turkey

Smart materials constructed through supramolecular assemblies have been receiving considerable attention because of their potential applications including self-healing materials, energy storage, photonic devices, sensors and theranostics. This book will provide an overview of the synthesis, properties and application of cucurbituril (CB) based nanostructures, as well as recent advances in the field. It will appeal to graduate students and researchers working in materials science, as well as those working on CB materials in organic and physical chemistry.

Hardback | 300 pages | 9781788014885 | 2019 | £159.00 | $220.00

ISBN 978-1-78801-488-5

Electrochromic Smart Materials

Fabrication and Applications

Jian Wei Xu Institute of Materials Research and Engineering, A*STAR, Singapore | **Ming Hui Chua** Institute of Materials Research and Engineering, A*STAR, Singapore | **Kwok Wei Shah** National University of Singapore, Singapore

Electrochromic devices have a wide range of applications, including displays, self-dimming mirrors for automobiles, electrochromic e-skins, textiles, and smart windows for energy-efficient buildings. This title covers major topics related to the phenomenon of electrochromism, highlighting a broad range of existing and potential applications of electrochromic materials and devices. Providing a comprehensive overview of the field, it will be of interest to postgraduate students and researchers in both academia and industry interested in smart design, materials science and engineering.

Hardback | 500 pages | 9781788011433 | 2019 | £179.00 | $250.00

ISBN 978-1-78801-143-3

Layered Materials for Energy Storage and Conversion

Dongsheng Geng University of Science and Technology Beijing, China |
Yuan Cheng Institute of High Performance Computing, A*STAR, Singapore |
Gang Zhang Institute of High Performance Computing, A*STAR, Singapore

The considerable interest in graphene and 2D materials is sparking intense research on layered materials due to their unexpected physical, electronic, chemical, and optical properties. After a brief introduction to layered materials, the chapters of this book gather various fascinating topics including electrocatalysis for fuel cells, lithium-ion and sodium-ion batteries, photovoltaic devices, thermoelectric devices, supercapacitors and water splitting. With contributions from key researchers, this book will be of interest to students, researchers and engineers worldwide who want a basic overview of the latest progress and future directions.

Hardback | 300 pages | 9781788014267 | 2019 | £159.00 | $220.00

ISBN 978-1-78801-426-7
9 781788 014267

Smart Membranes

Liang-Yin Chu Sichuan University, China

Smart membranes that respond to environmental stimuli are gaining attention because of their potential use in a variety of applications, from drug delivery to water treatment. This book will cover topics such as novel design and fabrication strategies, approaches for controlling structure and performance, and novel applications of smart membranes. Edited by an internationally renowned expert and with contributions from key researchers, this book will appeal to students and researchers across materials science, chemistry, chemical engineering, pharmaceutical science and biomedical science.

Hardback | 400 pages | 9781788012430 | 2019 | £169.00 | $235.00

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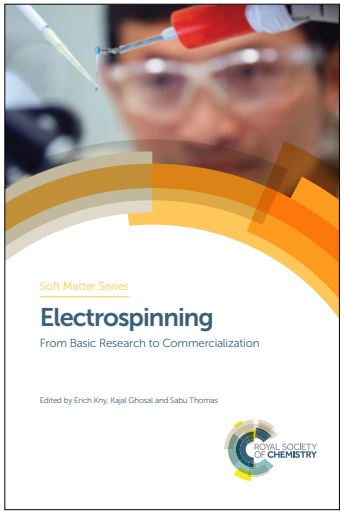

About the series

ISSN: 2048-7681

Series editors
Hans-Jürgen Butt Max Planck Institute for Polymer Research, Germany | **Ian W Hamley** University of Reading, UK | **Howard A Stone** Princeton University, USA

With contributions from experts in the field, the books in this series provide an essential overview of the latest developments in soft matter research. Each title covers a specific aspect of soft matter, from the fundamental concepts of soft matter systems to the diverse applications across different disciplines. The books are suitable for advanced undergraduate students, postgraduate students and professional researchers working in soft matter science and related fields.

Polymer Colloids

Formation, Characterization and Applications

Rodney Priestley Princeton University, USA | **Robert Prud'homme** Princeton University, USA

Based on a specialised course by the editors, this book provides the reader with an invaluable single source of reference on polymer colloids. The first section describes formation, explaining basic properties of emulsions and dispersion polymerization, microfluidic approaches to produce polymer-based colloids and formation via directed self-assembly. The next section details characterisation methodologies from microscopy and small angle scattering, to surface science and simulations. Finally, the book finishes with chapters devoted to applications, including pickering emulsions, active matter, and molecular engineering for materials development.

Hardback | 400 pages | 9781788014175 | 2019 | £169.00 | $235.00

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Polymer-modified Liquid Crystals

Ingo Dierking University of Manchester, UK

Bridging soft matter physics, materials science and engineering, polymer-modified liquid crystals are an exciting class of materials. They represent a vibrant field of research, promising advances in display technologies, as well as non-display uses. Describing all aspects of polymer-dispersed and polymer-stabilized liquid crystals, the broad coverage of this book makes it a must-have resource for anyone working in the area. The reader will find expert accounts covering basic concepts, materials synthesis and polymerization techniques, properties of various dispersed and stabilized phases, and critical overviews of their applications.

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Nanoscience

Volume 6

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