

Energy & environment

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from the Royal Society of Chemistry

Our books publishing programme supports scientists, researchers, students and teachers with high quality, internationally respected chemical science titles spanning the breadth of our subject.

The books we're publishing in 2018 cover the core disciplines, related fields and emerging topics such as chemical biology and functional food. Contributions come from all over the world, from leading researchers including Emma Raven, Mark Vrakking, Jintao Zhang and Bill Price.

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It's been 10 years since the first book in our Catalysis series – *Carbons and Carbon Supported Catalysts in Hydroprocessing* – hit the shelves. Since then, the series has grown to include over 30 titles, and there are five more joining the series this year. Head to page 54 to read more.

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For a list of books published prior to 2018, visit rsc.li/backlist

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Written and edited by world experts, the series and professional reference titles that fall into our energy and environment collection tackle some of the most important and rapidly growing fields of chemistry affecting our world and its resources, from bioplastics to coal in the 21st century.

Five minutes with...



Name David Tilley

Affiliation University of Zurich

Author of *Advances in Photoelectrochemical Water Splitting*

Publication date December 2017

ISBN 9781782629252

What are your research priorities at the moment?

Discovering new high performance materials for solar energy conversion.

What do you think the future looks like for your field?

Well predictions are hard, especially about the future, but I feel that considering the wide range of subdisciplines and interdisciplinarity within PEC water splitting, we can look forward to many more years of creative discovery within the field.

What can we expect from your book?

My hope is to provide a broad perspective on the field as it stands today, and to provide students and researchers with a chance to see how they might contribute to tackling one part of the challenge, to see what most interests them and where they could have an impact.

What gets you up in the morning?

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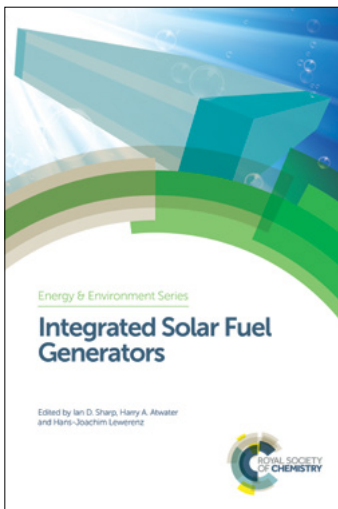
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Energy lies at the heart of modern society, and it is critical that we make informed choices of the methods by which we convert and manage energy. This series provides up-to-date and critical perspectives on the various options that are available. The wide range of topics covered reflects the wealth of chemical ideas and concepts that have the potential to make an important impact the search for sustainable energy. Books in this series form important references for chemists and material scientists, chemical and process engineers, energy researchers, bio-scientists and environmental scientists from across academia, industry and Government.

Advances in Photoelectrochemical Water Splitting

ee

Theory, Experiment and Systems Analysis

S David Tilley University of Zurich, Switzerland | **Stephan Lany** National Renewable Energy Laboratory, USA | **Roel van de Krol** Helmholtz Zentrum Berlin, Germany

With a strong focus on theory, this book is an up-to-date review of photoelectrochemical water splitting. The book discusses prediction of band alignments, the discovery of novel materials with attractive band gaps and stability; recent developments such as protective overlayers for photoanodes and in operando X-ray measurements of PEC cells; and concludes with a systems analysis of photoelectrochemical water splitting technologies. It is an important reference for researchers working in solar fuels as well as those working in theoretical chemistry.

Hardback | 250 pages | 9781782629252 | 2018 | £149.00 | \$209.00



Carbon Capture and Storage

ee

Niall Mac Dowell Imperial College London, UK

This book will provide the latest global perspective on the role and value of carbon capture and storage (CCS) in delivering temperature targets and reducing the impact of global warming. As well as providing a comprehensive, up-to-date overview of the major sources of carbon dioxide emission and negative emissions technologies, the book also discusses technical, economic and political issues associated with CCS along with strategies to enable commercialisation.

Hardback | 350 pages | 9781788011457 | 2018 | £159.00 | \$223.00





Electrochemical Reduction of Carbon Dioxide

Overcoming the Limitations of Photosynthesis

David Fermin University of Bristol, UK | **Frank Marken** University of Bath, UK

One of the crucial challenges in the energy sector is the efficient capture and utilisation of CO₂ generated from fossil fuels. This book covers the most recent developments in the field of electrochemical reduction of CO₂, from first-principle mechanistic studies to technological perspectives. An introduction to basic concepts in electrochemistry and electrocatalysis is included to provide a background for newcomers to this field. This book provides a comprehensive overview for researchers and industrial chemists working in environmental science, electrochemistry and chemical engineering.

Hardback | 300 pages | 9781782620426 | 2018 | £149.00 | \$209.00



Integrated Solar Fuel Generators

Ian D Sharp Lawrence Berkeley National Laboratory, USA | **Harry A Atwater** California Institute of Technology, USA | **Hans-Joachim Lewerenz** Helmholtz-Zentrum Berlin, Germany

Exploring integrated artificial photosystems, this book discusses the scientific and engineering efforts to overcome the formidable challenges involved with this solar fuels technology. It describes the critical areas of research and development towards viable integrated solar fuels systems, the current state of the art of these efforts, and outlines the future research needs that will accelerate progress towards a deployable technology. It is an important reference for researchers and industrialists in chemistry and engineering working in solar energy conversion.

Hardback | 350 pages | 9781782625551 | 2018 | £169.00 | \$237.00



Lignin Valorization

Emerging Approaches

Gregg T Beckham National Renewable Energy Laboratory, USA

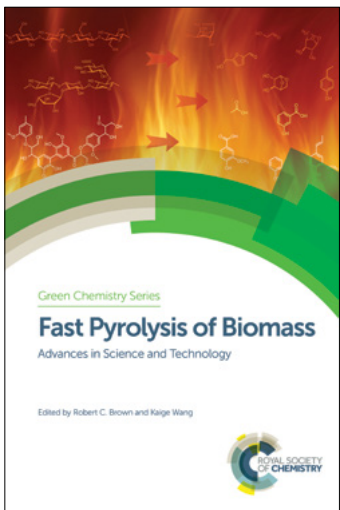
Lignocellulosic biomass represents a vast resource for the sustainable production of renewable fuels, chemicals, and materials. This book reviews the latest breakthroughs and challenges in upgrading lignin to fuels and chemicals. Bringing together biology, catalysis, engineering, and analytical chemistry, it presents a comprehensive picture of how lignocellulosic biorefineries could potentially employ lignin valorization technologies. It is ideal for graduate students and researchers working in lignin as well as industrialists working in biorefinery technologies.

Hardback | 500 pages | 9781782625544 | 2018 | £179.00 | \$251.00



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ISSN: 1757-7039

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Andrzej Stankiewicz Delft Technical University, The Netherlands | **Peter Seidl** Universidade Federal do Rio de Janeiro, Brazil

Green chemistry is one of the most important and rapidly growing fields in modern chemistry, and is widely recognised as being important across the chemical sciences, and throughout industry, education and research. This series provides high-level research books at the cutting-edge of green chemistry. The books are invaluable to industrialists, researchers and academics worldwide and anyone interested in the practical means that are being used to reduce the environmental impact of chemical processes and products.

Bioplastics and Biocomposites



A Practical Introduction

David Grewell Iowa State University, USA

Providing readers with a fundamental understanding of plastics and polymer processing, this book introduces bioplastics and biocomposites. Concepts covered include bioplastic processing, formulations, biocomposites, properties of biobased materials, economic evaluations of biobased materials, end of life treatment as well as environmental impacts of biobased materials. This book is ideal for researchers new to this field looking for a solid understanding in the materials science, processing and social and economic impacts of bioplastics.

Hardback | 250 pages | 9781782626565 | 2018 | £149.00 | \$209.00



Continuous Flow Reactors



From an Emerging Tool to a Mainstream Technology

Charlotte Wiles Chemtrix BV, The Netherlands

From the perspective of a synthetic organic chemist, this book looks at the advantages and challenges associated with the development of continuous flow processes for both reactions and downstream processing. With rapid growth in interest within the field of continuous flow reactions, this book provides readers with a one-stop resource on new trends and techniques. Where possible, industrial examples of the technologies implementation is also given. This book is of interest to practising chemists and researchers as well as graduate students new to this field.

Hardback | 250 pages | 9781849739245 | 2018 | £149.00 | \$209.00





CO₂-switchable Materials

Solvents, Surfactants, Solutes and Solids

Philip G Jessop Queen's University, Canada | **Michael F Cunningham** Queen's University, Canada

Summarising recent progress in the preparation, self-assembly, and functional applications of CO₂-responsive materials, this book explores physical chemistry of CO₂-switching, including constraints on structural design and process conditions, together with applications. The book emphasises the environmental, health, and safety advantages and disadvantages compared to conventional materials. It is ideal for researchers and industrialists working in green chemistry, chemical engineering, and polymer chemistry.

Hardback | 250 pages | 9781782628767 | 2018 | £149.00 | \$209.00



Green Chemistry for Surface Coatings and Adhesives

Sustainable Technologies and Applications

Avtar Matharu University of York, UK | **Rainer Hofer** Editorial Ecosiris, Germany | **Zhanrong Zhang** Chinese Academy of Sciences, China

Highlighting sustainable technologies and applications of renewable raw materials within the framework of green and sustainable chemistry, circular economy and resource efficiency, provides a cradle-to-cradle perspective. From potential feedstocks to recycling/reuse opportunities and the de-manufacture of adhesives and solvents, the book applies green chemistry principles to all aspects of adhesive and sealant manufacture. The book is ideal for researchers and industrialists working in green chemistry, industrial coatings, adhesives and inks and printing technologies.

Hardback | 300 pages | 9781782629948 | 2018 | £179.00 | \$223.00



Green Surface Coatings, Inks, and Adhesives

Renewable Raw Materials

Rainer Hofer Editorial Ecosiris, Germany

Providing a detailed survey of renewable raw materials for paints, inks and glues, this book examines the raw materials that are used, their sourcing and processing. It explores biorefineries and white biotechnology manufacturing technologies and the use of renewable raw materials in the latest developments in industrial surface coatings and adhesives. The book is ideal for researchers and industrialists working in green chemistry, industrial coatings, adhesives and inks and printing technologies.

Hardback | 300 pages | 9781782629931 | 2018 | £159.00 | \$223.00



Rubber Recycling

Challenges and Developments

Jin Kuk Kim Gyeongsang National University, South Korea | **Prosenjit Saha** Indian Institute of Engineering Science and Technology, Shibpur, India | **Sabu Thomas** Mahatma Gandhi University, India | **Józef T Haponiuk** Gdansk University of Technology, Poland

This book presents an up-to-date overview of the fundamental and applied aspects of renewability and recyclability of rubber materials, emphasising existing recycling technologies with significant potential for future applications along with a detailed outline to new technology-based processing of rubber to reuse and recycle. This book will be of interest to postgraduates and researchers in academia and industry in polymer chemistry, materials processing, materials science and engineering.

Hardback | 400 pages | 9781788010849 | 2018 | £169.00 | \$237.00





Supercritical and Other High-pressure Solvent Systems



For Extraction, Reaction and Material Processing

Andrew J Hunt University of York, UK | **Thomas M Attard** University of York, UK

Exploring the range and utility of high-pressure solvent systems across a variety of different chemical applications, this book brings together recent advances in supercritical technology and other pressurised-solvent systems. It provides an in-depth overview of the latest advances and developments and discusses the limitations and drawbacks that need to be addressed. Wherever possible, the greenness and economic viability of the different solvent systems is highlighted. This book is ideal for researchers and industrialists working in environmental science, green chemistry and biorefineries.

Hardback | 350 pages | 9781782628804 | 2018 | £169.00 | \$237.00



Sustainable Catalysis for Biorefineries



Francesco Frusteri Institute for Advanced Energy Technologies "Nicola Giordano", Italy | **Donato Aranda** Universidade Federal do Rio de Janeiro, Brazil | **Giuseppe Bonura** Institute for Advanced Energy Technologies "Nicola Giordano", Italy

Biorefineries are becoming increasingly important in providing sustainable routes for chemical industry processes. This book explores the most effective or promising catalytic processes for the conversion of biobased components into high added value products, as platform chemicals and intermediates. With a focus on heterogeneous catalysis, this book is ideal for researchers working in catalysis and in green chemistry.

Hardback | 350 pages | 9781782629634 | 2018 | £169.00 | \$237.00



Sustainable Synthesis of Pharmaceuticals



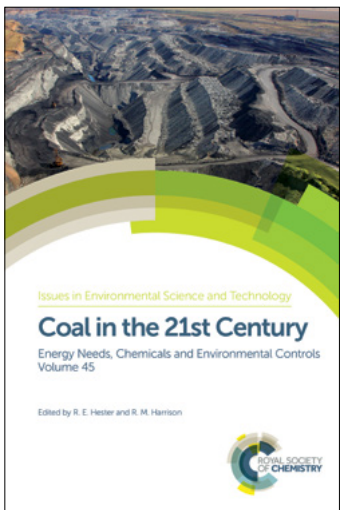
Using Transition Metal Complexes as Catalysts

Mariette M Pereira University of Coimbra, Portugal | **Mario J F Calvete** University of Coimbra, Portugal

There is a growing interest in the development of sustainable processes for the synthesis of pharmaceuticals and this book bridges the divide between industrial examples and the fundamental chemistry. It explains the basic principles of using transition metal catalysis with several green approaches for the synthesis of pharmaceuticals. Written by leading experts in the field, it provides a valuable and easy tool for scientists and industrialists who require information regarding this topic.

Hardback | 260 pages | 9781782629344 | 2018 | £159.00 | \$223.00





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ISSN: 1350-7583

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R M Harrison University of Birmingham, UK | **R E Hester** University of York, UK

Written by world experts in their specialised fields, this series tackles important environmental topics. It also focuses on broader issues, notably economic, legal and political considerations. Authors are drawn from industry, the public service and academic organisations. The books are invaluable for scientists and engineers in industry and public service, consultancy and academic institutions. They are also essential reading for students taking specialised courses in environmental chemistry, and provide supplementary reference material for general science courses. Two new volumes are published each year and the series is available through subscription as well as individual purchase.

Coal in the 21st Century



Energy Needs, Chemicals and Environmental Controls

R E Hester University of York, UK | **R M Harrison** University of Birmingham, UK

Coal has been the fastest growing energy resource in recent years, especially in developing nations where demand for electricity is growing rapidly. This book examines the impacts that the ongoing mining and burning of coal is having on our environment. It is an important reference for students studying energy and the environment; researchers and industrialists working in energy; and policy-makers involved in the regulations surrounding energy and the environment.

Hardback | 216 pages | 9781782628606 | 2018 | £70.00 | \$98.00



Plastics and the Environment



R M Harrison University of Birmingham, UK | **R E Hester** University of York, UK

As the call to ban plastic microbeads from cosmetics grows, *Plastics and the Environment* casts a timely light over the societal usage and potential environmental impact of plastics. Written by leading experts, this book provides a scientifically informed overview of the key issues surrounding the topic, from discussions on marine litter, to the impact on wildlife and human exposure. Aimed at policy makers, students, environmental scientists and thinkers, it will be an important review bringing the reader right up to date.

Hardback | 200 pages | 9781788012416 | 2018 | £70.00 | \$98.00





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Photochemistry



Volume 46

Angelo Albini University of Pavia, Italy | **Stefano Protti** University of Pavia,

Reviewing photo-induced processes that have relevance to a wide ranging number of academic and commercial disciplines and interests, this volume reflects the current interests in chemistry, physics, biology and technology. Essential reading for postgraduates, academics and industrialists working in the field of photochemistry, enabling them to keep on top of the literature.

Hardback | 350 pages | 9781788013369 | 2019 | £314.95 | \$441.00



Professional Reference



Drinking Water Treatment for Developing Countries



Physical, Chemical and Biological Pollutants

Aniruddha Pandit Institute of Chemical Technology, Mumbai, India | **Jyoti Kumar** Institute of Chemical Technology, Mumbai, India

Taking an engineering approach, this book discusses the treatment of chemical, physical and biological pollutants in drinking water, covering both piped and household water. With a firm focus on developing countries, treatments and selection criteria are considered in the context of issues relevant to African, Asian, Latin American continents, and the Caribbean. With the use of case studies, the authors show how theory translates to real world matters, comparing and contrasting treatments, and underlining the efficiencies and drawbacks of each. This book is perfect for graduate level course use, and as a self-study guide for researchers and practitioners working in the field.

Hardback | 350 pages | 9781788010191 | 2019 | £86.99 | \$122.00



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Wayne Tian | Royal Society of Chemistry

5th Floor, South Block, Tower C,
Raycom InfoTech Park,
2 Kexueyuan South Road,
Haidian District,
Beijing 100190, China
Tel 00 86 1391 091 3625
Email tianw@rsc.org

Eastern Europe

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Burlington House
Piccadilly, London
W1J 0BA, UK

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