Biofabrication and 3D Tissue Modeling

Dong-Woo Cho  Pohang University of Science and Technology (POSTECH), Korea

Synopsis

3D tissue modelling is an emerging field used for the investigation of disease mechanisms and drug development. The two key drivers of this upsurge in research lie in its potential to offer a way to reduce animal testing with respect to biotoxicity analysis, preferably on physiology recapitulated human tissues and, additionally, it provides an alternative approach to regenerative medicine. Integrating physics, chemistry, materials science, and stem cell and biomedical engineering, this book provides a complete foundation to this exciting, and interdisciplinary field. Beginning with the basic principles of 3D tissue modelling, the reader will find expert reviews on key fabrication technologies and processes, including microfluidics, microfabrication technology such as 3D bioprinting, and programming approaches to emulating human tissue complexity. The next stage introduces the reader to a range of materials used for 3D tissue modelling, from synthetic to natural materials, as well as the emerging field of tissue derived decellularized extracellular matrix (dECM).

Brief Contents

• Microstereolithography
• Extrusion-based Bioprinting
• Microfluidic Platforms for Biofabrication and 3-D Tissue Modeling
• Computational Design and Modeling of Linear and Nonlinear Elastic Tissue Engineering Scaffold Triply Periodic Minimal Surface (TPMS) Porous Architecture
• Shear Thinning Hydrogel-Based 3D Tissue
• Polymers in Biofabrication and 3D Tissue Modelling
• Decellularized tissue matrix-based 3D tissue modeling
• 3D Tissue Modelling of the Central Nervous System
Coffee Consumption and Health Implications
Adriana Farah Universidade Federal do Rio de Janeiro, Brazil

Synopsis
Coffee is one of the most popular drinks in the world but what are the health advantages or disadvantages from consuming it? This book covers how health is influenced by the consumption of coffee from protective effects to potential contributions of bioactive compounds to health and potential risks involved. Written by an international collection of contributors in the field who concentrate on coffee research, it is edited expertly to ensure consistency and organization across the chapters.

Brief Contents
- Coffee Consumption and Health Impacts: A Brief History of Changing Conceptions
- Coffee Antioxidants in Chronic Diseases
- Anti-inflammatory Activity of Coffee
- DNA Protective Properties of Coffee: From Cells to Humans
- Preventive Effect of Coffee Against Cardiovascular Diseases
- Coffee in the Development, Progression and Management of Type 2 Diabetes
- Caffeine and Parkinson’s Disease: From Molecular Targets to Epidemiology to Clinic Trials
Coffee
Production, Quality and Chemistry
Adriana Farah Universidade Federal do Rio de Janeiro, Brazil

Synopsis
Coffee is one of the most popular drinks in the world but how does the production influence chemistry and quality? This book covers coffee production, quality and chemistry from the plant to the cup. Written by an international collection of contributors in the field who concentrate on coffee research, it is edited expertly to ensure quality of content, consistency and organization across the chapters. Aimed at advanced undergraduates, postgraduates and researchers and accompanied by a sister volume covering how health is influenced by the consumption of coffee, these titles provide an impactful and accessible guide to the current research in the field.

Brief Contents
- Coffee: Production, Quality and Chemistry, Part I: Introduction to Coffee Plant and Genetics
- Coffee Growing
- Breeding
- Coffee Plant Biochemistry
- Mineral Nutrition and Fertilization
- Coffee Grading and Marketing
- Decaffeination and Irradiation
- Roasting
- Grinding, Packing and Storage

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Electron Paramagnetic Resonance
Volume 26

Victor Chechik  University of York, UK
Damien M Murphy  University of Cardiff, UK

Synopsis
The topics covered in this volume describe contrasting types of Electron Paramagnetic Resonance (EPR) application, which remain very significant in modern science. This volume compiles critical coverage of developments in the recent literature by a hand-picked group of researchers at the cutting-edge of the field. Providing a snapshot of the area, this book is a useful addition to any library supporting this research.

Brief Contents
- Intrinsically disordered proteins (IDPs) studied by EPR and in-cell EPR
- EPR Spectroscopy in the Study of 2D Graphene-based Nanomaterials and Nanographites
- Nitroxide spin labels: fabulous spy spins for biostructural EPR applications
- Applications of Light-Induced Hyperpolarization in EPR and NMR
- Applications of Electron Paramagnetic Resonance Spectroscopy for Interrogating Catalytic Systems

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Electrochromic Smart Materials
Fabrication and Applications

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

**Synopsis**
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.

**Brief Contents**
- Introduction to Electrochromism
- Fundamentals of Electrochromic Materials and Devices
- Conjugated Polymers for Electrochromic Applications
- Donor-acceptor Type Conjugated Electrochromic Polymers
- Electrochromic, Electrofluorescent and Light-induced Coloration Effects
- Bistable Electrochromic Windows from Conjugated Polymers
- Electroluminochromism: Classical Materials and New Developments
- Donor-Acceptor Electrochromic Conjugated Polymers with Different Structures
- Electrochromic and Electrofluorescence Liquid Crystals

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Advance Book Information  January 2019

Genomics and Clinical Diagnostics

David Whitehouse  University of Hertfordshire, UK
Ralph Rapley  University of Hertfordshire, UK

Synopsis
With large genome initiatives being announced around the world, this book provides a timely graduate level introduction to molecular diagnostics technologies and applications to enable readers to embrace the subject and original literature. The first of four sections delivers readily accessible introductory information on the purposes, properties and drawbacks of diagnostic tests followed by chapters on the principal molecular technologies that underpin the information in the later sections. The following two sections provide more specialised examples of currently used diagnostic technologies and insights into selected key diagnostic challenges including specific examples, automation and point of care testing. The book concludes with a section on future prospects focusing on mutation detection for personalised medicine, for example in cancer.

Brief Contents

• Basic Analysis of Nucleic Acids
• Genes and Genomes
• Molecular Biology Techniques
• Proteomics
• Bioinformatics
• Molecular Diagnostics
• Nanoparticle Diagnostics
• Molecular Microbial Diganostics
• Parasite Genomes and Diagnostics
• Connective Tissue
Good Enough to Eat?
Next Generation GM Crops
Ian D Godwin The University of Queensland, Australia

Synopsis
How are genetically modified (GM) crops created and why? How will crops evolve in future with scientists using new gene editing tools? Ian Godwin, a professor in plant molecular genetics, explores these questions in a fun and accessible style in Good Enough to Eat. The book delves into the social, political, and philosophical arguments for and against GM crops as well as the science behind them and puts this knowledge into the context of global food security and sustainability. Godwin interviews biologists and farmers, nutritionists and activists along the way.

Brief Contents
• Food, Glorious Food
• A Kind of Magic
• Revolution
• Chemical Heart
• Wide Open Spaces
• Bad Moon Rising
• Paint It Black, Not Ready to Make Nice
• O Fortuna!
• New Kid in Town
• For a Better Day

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Legumes

Nutritional Quality, Processing and Potential Health Benefits

Maria Ángeles Martín-Cabrejas Universidad Autónoma de Madrid, Spain

Synopsis

Legumes have high potential for improving the nutritional quality of foods, but limited data on their bioactive compounds exists. This book provides a comprehensive overview of the antioxidant activity and health aspects of legumes. The international spread of contributors will describe the key factors that influence consumer acceptance of legumes in the diet, as well as the known functional properties of legumes and legume based food products. It will serve as an excellent and up-to-date reference for food scientists, food chemists, researchers in human nutrition, dietetics and the chemistry of natural compounds.

Brief Contents

• Nutritional Quality, Processing and Potential Health Benefits of Legumes: An Overview
• Bioactive Compounds of Legumes: Legume Seeds as a Source of Phenolic Acids, Condensed Tannins, and Lignans
• Phenolic compounds: Flavonoids in Legumes
• Role of Dietary Fibre in Legumes
• Legume Bioactive Peptides
• Melatonin in Legumes
• Non-nutritional Factors (Lectins, Phytic acid, Proteases Inhibitors, Allergens)
• Processing of Legumes: Changes of Bioactive Compounds: Germination
• Impact of Fermentation on the Nutritional Quality, Bioactive Compounds and Potential Health Properties of Legumes

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Hybrid MR-PET Imaging of the Brain
Systems, Methods and Applications
N Jon Shah Forschungszentrum Juelich GmbH, Germany

Synopsis
The combination of two leading imaging techniques – magnetic resonance imaging (MRI) and positron emission tomography (PET) – has recently been a driver of research and clinical application. The hybrid instrument is capable of acquiring both datasets simultaneously and this affords a number of advantages ranging from the acquisition of two datasets in the normal time required for one through to novel applications. This book describes the issues involved in bringing together the two techniques into one machine and all the advantages in doing so. Novel applications in brain imaging are presented and the combined technique is poised to have a large impact on the industry. Aimed at students and scientists entering the field, it will provide practical details from experts working in the area.

Brief Contents
- Part A - Basics: Section I: Magnetic Resonance Imaging: Introduction to MRI
- MRI Instrumentation
- Selective Applications of MRI for Brain Imaging
- Ultra-High Field and Emerging Applications
- Section II: Positron Emission Tomography: Introduction to PET
- Instrumentation
- Quantification
- Kinetic Modeling and Extraction of Metabolic Parameters
- Part B - Hybrid MR-PET Imaging: Technical Overview: Section I: Hardware: Introduction and Historical Overview
Organic Catalysis for Polymerisation

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

Synopsis
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.

Brief Contents
- Nucleophilic Catalysts and Organocatalyzed Zwitterionic Ring-Opening Polymerization of Heterocyclic Monomers
- Ring-Opening Polymerization Promoted by Brønsted Acid Catalysts
- Bifunctional and Supramolecular Organocatalysts for Polymerization
- Base Catalysts for Organopolymerization
- Ring-opening Polymerization of Lactones
- Organic Catalysis for the Polymerization of Lactide and Related Cyclic Diesters
- ROP of Cyclic Carbonates
- Metal-free Polyether Synthesis by Organocatalyzed Ring-Opening Polymerization

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Polymer-modified Liquid Crystals

Ingo Dierking University of Manchester, UK

Synopsis
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.

Brief Contents

- Phase Separation in Polymer-Liquid Crystal Systems
- Reactive Monomers and Polymerization Mechanisms
- Electron Beam Curing
- Polymer Dispersed Liquid Crystals
- Polymer Stabilized Liquid Crystals
- Polymer Stabilized Nematics and their Applications
- Polymer Stabilized Cholesterics, Properties, Display and Non-Display Applications
- Polymer Stabilized Ferroelectric Liquid Crystals and their Applications
- Electro-Polymerized Ferroelectric Liquid Crystals

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The Science of Chocolate

Stephen T Beckett

Synopsis

Now in its third edition, this bestselling book describes the complete chocolate making process from growing the beans to the sale in the shops. It has been ten years since the last edition was published and Stephen Beckett has improved and expanded the text to bring it up to date. Revisions include a new chapter ‘How do they make that?’ which details, for example, how air is incorporated into Aero, how chocolate shapes are filled and other distinctive products. This popular title will appeal to anyone with a fascination for chocolate including food scientists and those working in the confectionery industry.

Brief Contents

• The History of Chocolate
• Chocolate Ingredients
• Cocoa Bean Processing
• Liquid Chocolate Making
• Controlling the Flow Properties of Liquid Chocolate
• Crystallising the Fat in Chocolate
• Standard Product Manufacturing Processes
• Modifying Chocolate’s Eating Properties: How Do They Make That? (Some Distinctive Products)
• Analytical Techniques
The Rhubarb Connection and Other Revelations

The Everyday World of Metal Ions

Lars Öhrström Chalmers University of Technology, Sweden
Jacques Covès CNRS Universite Joseph Fourier Grenoble

Synopsis
Pink warships that vanish at dusk, urinary maladies of an emperor, and a gold test for cocaine — behold the chemistry of metal ions as never before. Expect to encounter a fair share of heroes and villains, real and fictional, scientist and layperson. Such characters include an ex-MI5 employee running a hospital ward in London amid falling German V1 rockets, a notorious racing cyclist, a proud butler and the lady who first proposed nuclear fission (it’s not who you think it is). With engaging, humorous and intelligent prose, the reader will discover the fascinating back-stories of chemical discoveries and inventions where metal ions have played a major role.

Brief Contents
• Charlie Chaplin goes for gold but gets only chromium
• The fantastic metal ions and how to catch them
• Rhubarb, an Emperor and the Butler’s pride
• Mining, Magnets and Making New Elements
• On poisoning, self-poisoning and the Euro
• Down to Earth Chemistry
• Chemicals from trees and how the Pacific yew was saved
• Molecules and Murderers – the Art of Detection and Measuring
• Metal Medications and Metals vs Medicines
• Blood, Iron and Body Metals
• Vanishing Warships and Sugary Gold

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Synopsis
This book looks at the many changes that are taking place in the tomato market and industry; producers are combining origin, tradition, territory, quality, service and supply chain to adapt to the needs of the new consumers. It deals with the topics that are pertinent to the current industry, for example rheology and mechanical properties; origin determination; innovation and new product development; volatile compounds and aroma, functional and healthy compounds; and sustainability and traditional products. Providing a comprehensive overview of the actual tomato industry.

Brief Contents
- New Approaches for Rapid Tomato Quality Control
- Volatile Taste/Odour Active Compounds and Aroma Generation in Tomato Products
- Consumer and Sensory Aspects of Tomato and Tomato Products
- Determination of Origin of Tomato Products
- Rheological Properties of Tomato Products
- Scientific Psychophysics and The Commercially Oriented Study of Tomato Sauce
- New Tomato Products Development in a Very Consolidated Market
- Use of Non-Conventional Technologies for Processing Tomato Products (US, HPH, HHP And PEF)