
Book Reviews

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1 The Biomedical Engineering Series
M.R. Neuman, Series Editor
An Introduction to Biomaterials
Second Edition
by: J.O. Hollinger
Published 2012
by CRC Press, Taylor & Francis Group
6000 Broken Sound Parkway NW, Suite 300, Boca Raton
FL 33487-2742, USA, 624pp
ISBN: 978-1-4398-1256-3 (Hardback)

The second edition of *An Introduction to Biomaterials* consists of 33 chapters that have been conceived and organised as a practical educational road map to provide a fundamental understanding of key families of biomaterials and underscore their potential applications in clinical therapeutics. These 33 chapters are organised into four sections:

- Section I: Biology, Biomechanics, Biomaterials Interactions.
- Section II: Biomaterials Testing, Statistics, Regulatory, Considerations, Intellectual Property.
- Section III: Biomaterials Compositions.
- Section IV: Biomaterials Applications.

The organisational format for the first 12 chapters provide basic instructional guidance on the seminal steps that must be addressed as a biomaterial transitions from an idea to the laboratory bench, and the design and development mature through specific testing paradigms and comply with regulatory guidance to the clinical patient. Consequently, two dedicated chapters in this edition emphasise wound healing. What does the 'body' do when a biomaterial is implanted? When are the cellular and humoral responses to biomaterial implantation?

The second edition of the textbook has been significantly improved over the first edition that was published in 2006. The improvements include nine completely new chapter and 24 chapters that have been updated and revised with new accomplishments and contemporary data. The authors include extensive reference, and therefore, the inquisitive student has every opportunity to explore a particular subject of interest in more detail; this is a valuable educational tool. The second edition is a comprehensive, yet manageable didactic work that will be an invaluable desk reference and instructional

textbook for undergraduates, graduated students, postdoctoral fellows, and, seasoned investigators working in exiting field of applied biomaterials science.

2 Optical Imaging and Metrology

Advanced Technologies

by: W. Osten and N. Reingand

Published 2012

by Wiley-VCH Verlag GmbH & Co. KGaA, Boschstrasse 12

69469 Weinheim, Germany, 482pp

Print ISBN: 978-3-527-41064-4, ePDF ISBN: 978-3-527-64847-4

ePub ISBN: 978-3-527-64846-7, mobi ISBN: 978-3-527-64845-0

oBook ISBN: 978-3-527-64844-3

- This book contains all contributions which were presented on occasion of the last HoloMet workshop ‘HoloMet 2010’ in Batatonfüred, Hungary. The year of HoloMet 2010 closed the first decade of the 21st century. During this period many key technologies such as micro electronics, photonics, informatics and mechatronics have shown an extremely fast development that perhaps was never seen before.
- A comprehensive review of the state of the art and advances in the field, while also outlining the future potential and development trends of optical imaging and optical metrology – an area of fast growth with numerous applications in nanotechnology and nanophysics. Written by leading experts, it fills a gap in the current literature by bridging the fields of optical imaging and metrology, and is a valuable up-to-date resource in terms of fundamental knowledge, basic concepts, methodologies, applications and development trends.

The book contains the following chapters:

- LCOS Spatial Light Modulators: Trends and Applications.
- Three-Dimension Display and Imaging: Status and Prospects.
- Holographic Television: Status and Future.
- Display Holography – Status and Future.
- Incoherent Computer-Generated holography for 3D Colour Imaging and Display.
- Approaches to Overcome the Resolution Problem in Incoherent Digital Holography.
- Managing Digital Holograms and the Numerical Reconstruction Process for Focus Flexibility.
- Three-Dimension Particle Control by Holographic Optical Tweezers.
- The Role of Intellectual Property Protection in Creating Business Optical Metrology.
- On the Difference between 3D Imaging and 3D Metrology for Computed Tomography.
- Coherence Holography: Principles and Applications.

- Quantitative Optical Microscopy at the Nanoscale. New Developments and Comparisons.
- Model-Based Optical Metrology.
- Advanced MEMS Inspection by Direct and Indirect Solution Strategies.
- Different Ways to Overcome the Resolution Problem in Optical Micro and Nano Metrology.
- Interferometry in Harsh Environments.
- Advanced Methods for Optical Non-destructive testing.
- Upgrading Holographic Interferometry for Industrial Application by Digital Holography.

3 Mechanical Properties of Solid Polymers

Third Edition

by: I.M. Ward and J. Sweeney

Published 2013

**by John Wiley & Sons Ltd., The Atrium, Southern Gate
Chichester, West Sussex, PO19 8SQ, United Kingdom, 461pp
Cloth ISBN: 9781444319507**

This book is the third edition of *Mechanical Properties of Solid Polymers* and follows the format of the first two editions in writing the chapters as separate units. Therefore, each chapter can be regarded as a self-contained introduction and review of process in the different aspects of the mechanical behaviour.

Since the publication of the second edition in 1983, the subject has advanced considerably in many respects, especially with regard to non-linear viscoelasticity, yield and fracture. We have altered some chapters very little notably those dealing with viscoelastic behaviour and the earlier research on anisotropic mechanical behaviour and rubber elasticity, only adding sections to deal with the latest developments.

In *Mechanical Properties of Solid Polymers, Third Edition*, the approach is to provide a formal description of the behaviour using the mathematical techniques of solid mechanics, followed by interpretation in terms of the molecular structure and morphology. The third edition combines the best qualities of its highly successful predecessors and includes:

- Finite strain and rubber-like elasticity.
- Linear viscoelasticity and mechanical relaxation.
- Anisotropic mechanical behaviour.
- Polymer composites and nanocomposites.
- Non-linear viscoelasticity.
- Yield, instability and breaking phenomena.

The book contains the following chapters:

- Structure of Polymers.
- The Mechanical Properties of Polymers: General Consideration.
- The Behaviour in the Rubber-Like State: Finite Strain Elasticity.
- Rubber-Like Elasticity.
- Linear Viscoelastic Behaviour.
- The Measurement of Viscoelastic Behaviour.
- Experimental Studies of Linear Viscoelastic Behaviour.
- As a Function of Frequency and Temperature: Time-Temperature Equivalence.
- Anisotropic Mechanical Behaviour.
- Polymer Composites: Macroscale and Microscale.
- Relaxation Transition: Experimental Behaviour and Molecular Interpretation.
- Non-linear Viscoelastic Behaviour.
- Yielding and Instability in Polymers.
- Breaking Phenomena.

Introduction the mechanical properties of solid polymers in a straightforward, rigorous and practical manner... an essential volume for students and scholars of physics, chemistry and chemical engineering, as well as polymer researchers, chemists, and chemical engineers or material scientists in government and industry.

4 Measuring Shape

by: F. Brent Neal and John C. Russ

Published 2012

by CRC Press, Taylor & Francis Group, 6000 Broken

Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

USA, a productivity press book, 420pp

ISBN: 978-1-4398-5598-0

Useful for those working in fields, including industrial quality control, research and security application, Measuring Shape is a handbook for the practice application of shape measurement. Covering a wide range of shape measurements likely to be encountered in the literature and in software packages, this book presents an intentionally diverse set of examples that illustrate and enable readers to compare methods used for measurement and quantitative description of 2D and 3D shapes. It stands apart through its focus on examples and application, which help grasp the usefulness of presented techniques without having to approach them through the underlying mathematics.

An elusive concept, shape is a principal governing factor in determining the behaviour of objective and structures. Essential to recognising and classifying objects, it is the central link in manmade and natural processes. Shape dictates everything from the

stiffness of a construction beam, to the ability of a leaf to catch water, to the marketing and packaging of consumer products. This book emphasises techniques that are quantitative and produce a meaningful yet compact set of numerical values that can be used for statistical analysis, comparison, correlation, classification and identification.

Written by two renowned authors from both industry and academia, this resource explains why users should select a particular method, rather than simply discussing how to use it. Showcasing each process in a clear, accessible and well-organised way, they explore why a particular one might be appropriate in a given situation, yet a poor choice in another. Providing extensive examples, plus full mathematical description of the various measurements involved they detail the advantages and limitations of each method and explain the ways they can be implemented to discover important correlations between shape and objective history or behaviour. This uncommon assembly of information also include sets of data on real-world objects that are used to compare the performance and utility of the various presented approaches.

5 Materials and Process Selection for Engineering Design

Third Edition

by: M.M. Farag

Published 2014

by CRC Press, Taylor & Francis Group, 6000 Broken

Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

USA, a productivity press book, 513pp

ISBN: 978-1-4665-6409-1 (pbk.)

Introducing a new engineering product or changing an existing model involves making designs, reaching economic decisions, selecting materials, choosing manufacturing processes and assessing its environment impact.

The objective of this book is to illustrate how the activities of design, materials and process selection, and economic and environmental analysis fit together and what sort of trade-off can be made in order to arrive at the optimum solution when developing a new product or changing an existing model.

The book starts with an introductory chapter that briefly reviews the stages of product development in industry, recycling of materials and life-cycle costing. The subject matter is then grouped into three parts. Part I consists of three chapters, which discuss the performance of materials in service. After a review of different types of mechanical failures and environmental degradation, the materials that are normally selected to resist a given type of failure are discussed. Part II consists of three chapters, which deal with the effect of materials and manufacturing process followed by a discussion of the effect of material properties and manufacturing processes on the design of components. Part III consists of four chapters, which are devoted to the selection and substitution of materials in industry. After brief review, the economics and environmental aspects of materials and manufacturing processes as well as quantitative and computer-assisted methods of screening are presented; comparing and ranking of alternative solutions and selecting the optimum solution are also discussed. The final chapter presents five different detailed case studies in materials selection and substitution.

The book is written for junior and senior engineering students who have completed a first course in engineering will also find the subject matter interesting and useful.

To enhance the value of the text as a teaching device a variety of examples and open-ended case studies are given to explain the subject matter and to illustrate its practical application in engineering.

This book contains the following parts and chapters:

- Product design and development in the industrial enterprise.

Part I: Performance of materials in service:

- Failure under mechanical loading.
- Corrosion, wear and degradation of materials.
- Selection of materials to resist failure.

Part II: Relations between design, materials and manufacturing process:

- Nature of engineering design.
- Effect of material properties on design.
- Effect of manufacturing process on design.

Part III: Selection and substitution of materials and processes in industry:

- Economics and environmental impact of materials and processes.
- Materials selection process.
- Materials substitution.
- Studies in materials selection and substitution.

Part IV: Appendices

6 74th Conferences of Glass Problems

A Collection Papers Presented at the 74th Conferences of Glass Problems Greater Columbus Conventional Center Columbus, Ohio, October 14–17, 2013

by: The American Ceramic Society

Published 2013

by John Wiley & Sons, Inc. Hoboken, New Jersey

111 River Street, Hoboken, NJ 07030-5774, USA

Published simultaneously in Canada , 252pp

ISBN: 987-1-118-93297-1, ISBN: 987-1-118-93293-3 (special edition),

ISSN: 0196-6219

In continuing the tradition that dates back to 1934, this volume is a collection of papers at the 74th Conferences of Glass Problems Conference (GPC) published as the 2013 edition of the collected papers. The manuscript included in this volume are reproduced as furnished by presenting authors, but were reviewed prior to the presentation and submission by the respective session chairs.

74th Conferences of Glass Problems Conference is organised by the Kazuo Inamori School of Engineering, Alfred University, NY, 14802 and The Glass Manufacturing Industry Council, Westerville, OH 43082.

The themes and chairs of five half-day sessions were as follows:

- Batching and Forming.
- Phil Tucker, Johns Manville, Denver, CO and Ken Bratton, Emhart Glass Research Inc., Windsor, Ct.
- Glass melting.
- Glenn Neff, Glass Service, Stuart, FL and Martin Goller, Corning Incorporated Corning, NY.
- Modelling, sensing and control.
- Bruno Purnode, Owens Corning Composite Solution, Granville, OH and Larry McCloskey.
- Toledo Engineering Company, Toledo, OH.
- Refractories I.
- Matthew Wheeler, RHI US LTD, Batavia, OH and Thomas Dankert, Owens-Illinois, Perrysburg, OH.
- Werren Coutis, PPG Industries, Pittsburgh, PA and Elmer Sperry, Libbey Glass, Toledo, OH.
- Refractories II.
- Andrew Zamurs, Rio Tinto minerals Greenwood, Co and Martin Goller, Croning Incorporated, Corning, NY.

7 Cavitation and Bubble Dynamics

by: C. Earls Brennen

Published 2014

by Cambridge University Press, 32 Avenue of the Americans

New York, NY 10013-2473, USA

Cambridge University Press in part of the Cambridge University, 249pp

ISBN: 978-1-107-64476-2 (pbk), ISBN: 978-1-107-64476-2 (Paperback)

Christopher Earls Brennen is The Richard and Dorothy M. Hayman Professor of Mechanical Engineering Emeritus in the Faculty of Engineering and Applied Science at the California Institute of Technology. He has published more than 200 refereed articles and is especially well known for his research on cavitation, turbomachinery and multiphase flows. He is author of three textbooks – *Fundamentals of Multiphase Flows*, *Hydrodynamics of Pumps* and *Cavitation and Bubble Dynamics* – and has edited several others.

Cavitation and Bubble Dynamics deals with the fundamentals physical processes of bubble dynamics and the phenomenon of cavitation. It is ideal for graduate students and

research engineers and scientists; a basic knowledge of fluid flow and heat transfer is assumed. The analytical methods presented are developed from basic principles.

The book begins with a chapter on nucleation and describes both chapters provide a systematic treatment of the dynamics and growth, collapse, or oscillation of individual bubbles in otherwise quiescent fluids. The following chapters summarise the motion of bubbles in liquids; describe some of the phenomena that occur in homogeneous bubbly flows, with emphasis on cloud cavitation; and summarise some of the experimental observation of cavitating flows. The last chapter provides a review of free streamline methods used to treat separated cavity flows with large attached cavities.

The book contains following chapters:

- Phase Change, Nucleation and Cavitation.
- Spherical Bubble Dynamics.
- Cavitation Bubble Collapse.
- Dynamics of Oscillating Bubbles.
- Translation of Bubbles.
- Homogeneous Bubble Flows.
- Cavitating Flows.
- Free Streamline Flows.