June 2013 Paper 61 Chemistry

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Short-Channel Organic Thin-Film Transistors Springer
This work takes advantage of high-resolution silicon stencil masks to build air-stable complementary OTFTs using a low-temperature fabrication process. Plastic electronics based on organic thin-film transistors (OTFTs) pave the way for cheap, flexible and large-area products. Over the past few years, OTFTs have undergone remarkable advances in terms of reliability, performance and scale of integration. Many factors contribute to the allure of this technology; the masks exhibit excellent stiffness and stability, thus allowing OTFTs with submicrometer channel lengths and superb device uniformity to be patterned. Furthermore, the OTFTs employ an ultra-thin gate dielectric that provides a sufficiently high capacitance to enable the transistors to operate at voltages as low as 3 V. The critical challenges in this development are the subtle mechanisms that govern the properties of aggressively scaled OTFTs. These mechanisms, dictated by device physics, are well described and implemented into circuit-design tools to ensure adequate simulation accuracy.
Foams: Physics, Chemistry and Structure John Wiley & Sons

Specification of Drug Substances and Products: Development and Validation of Analytical Methods, Second Edition, presents a comprehensive and critical analysis of the requirements and approaches to setting specifications for new pharmaceutical products, with an emphasis on phase-appropriate development, validation of analytical methods, and their application in practice. This thoroughly revised second edition covers topics not covered or not substantially covered in the first edition, including method development and validation in the clinical phase, method transfer, process analytical technology, analytical life cycle management, special challenges with generic drugs, genotoxic impurities, topical products, nasal sprays and inhalation products, and biotechnology products. The book's authors have been carefully selected as former members of the ICH Expert Working Groups charged with developing the ICH guidelines, and/or subject-matter experts in the industry, academia and in government laboratories. Presents a critical assessment of the application of ICH guidelines on method validation and specification setting Written by subject-matter experts involved in the development and application of the guidelines Provides a comprehensive treatment of the analytical methodologies used in the analysis, control and specification of new drug substances and products Covers the latest statistical approaches (including analytical quality by design) in the development of specifications, method validation and shelf-life prediction

The Book: A Cover-to-Cover Exploration of the Most Powerful Object of Our Time

Elsevier

Health Benefits of Fermented Foods and Beverages discusses the functionality and myriad health benefits of fermented foods and beverages of the world. It examines health-promoting and therapeutic properties, covering the molecular process of fermentation and the resulting benefit to nutritional value and long-term health. Exploring a range of ferme

Contemporary Campus Design Royal Society of Chemistry

Historically, the scientific method has been said to require proposing a theory, making a prediction of something not already known, testing the prediction, and giving up the theory (or substantially changing it) if it fails the test. A theory that leads to several successful predictions is more likely to be accepted than one that only explains what is already known but not understood. This process is widely treated as the conventional method of achieving scientific progress, and was used throughout the twentieth century as the standard route to discovery and experimentation. But does science really work this way? In Making 20th Century Science, Stephen G. Brush discusses this question, as it relates to the development of science throughout the last century. Answering this question requires both a philosophically and historically scientific approach, and Brush blends the two in order

to take a close look at how scientific methodology has developed. Several cases from the history of modern physical and biological science are examined, including Mendeleev's Periodic Law, Kekule's structure for benzene, the light-quantum hypothesis, quantum mechanics, chromosome theory, and natural selection. In general it is found that theories are accepted for a combination of successful predictions and better explanations of old facts. Making 20th Century Science is a large-scale historical look at the implementation of the scientific method, and how scientific theories come to be accepted.

Science and Engineering World Scientific
Annual Reports in Computational Chemistry, Volume 17 provides timely and critical reviews on important topics in computational chemistry. Topics covered in the series include quantum chemistry, molecular mechanics, force fields, chemical education, and applications in academic and industrial settings. Focusing on the most recent literature and advances in the field, each article covers a specific topic of importance to computational chemists. Includes timely discussions on quantum chemistry and molecular mechanics Covers force fields, chemical education, and more Presents the latest in chemical education and applications in both academic and industrial settings

Molecular Structure and Statistical Thermodynamics World Scientific
A university campus is a place with special resonance: conjuring images of cloistered quadrangles and wood-panelled libraries,

often echoing centuries of scholarly tradition. And yet it is also a place of cutting-edge science, interactive learning, youth, vibrancy, and energy. It is this dual nature which makes the physical environment of a university so dynamic as well as a highly challenging landscape to design and manage successfully. Today, the scale of the pressures and the rate of change facing higher education institutions are greater than ever. Squeezed public spending, rising tuition fees and the growing education ambitions of developing nations are set against a backdrop of rapid technological progress and changing pedagogies. What are the repercussions for the physical realities of university planning and architecture? And how are university campuses adapting to contend with these pressures? University Trends introduces the most significant, widespread and thought-provoking trends in campus design today. Part 1 identifies current trends such as starchitecture, large-scale campus extensions, adaptive re-use, and international branch campuses. Part 2 profiles each trend via highly-illustrated, global case studies of well-publicised as well as lesser-known projects. The essential guide to current and future trends in campus design.

Journal of Research of the National Bureau of Standards Elsevier

Many studies have highlighted the importance of discourse in scientific understanding. Argumentation is a form of scientific discourse that plays a central role in the building of explanations, models and theories. Scientists use arguments to relate the evidence that they select from their investigations and to justify the claims that they make about their observations. The implication is that argumentation is a scientific habit of mind that needs to be

appropriated by students and explicitly taught through suitable instruction. Edited by Sibel Erduran, an internationally recognised expert in chemistry education, this book brings together leading researchers to draw attention to research, policy and practice around the inclusion of argumentation in chemistry education. Split into three sections: Research on Argumentation in Chemistry Education, Resources and Strategies on Argumentation in Chemistry Education, and Argumentation in Context, this book blends practical resources and strategies with research-based evidence. The book contains state of the art research and offers educators a balanced perspective on the theory and practice of argumentation in chemistry education.

Physics and chemistry John Wiley & Sons "This book offers balanced coverage of the technological solutions that contribute to the design of digital textbooks and contribute to achieving learning objectives, offering an emphasis on assessment mechanisms and learning theory"--

Mining and Selling Radium and Uranium Oxford University Press Demonstrating the shortcomings of current policy and legal approaches to access and benefit-sharing (ABS) in the Convention on Biological Diversity (CBD), this book recognizes that genetic resources are widely distributed across countries and that bilateral contracts undermine fairness and equity. The book offers a practical and feasible regulatory alternative to ensure

the goal of fairness and equity is effectively and efficiently met. Through a legal analysis that also incorporates historic, economic and sociological perspectives, the book argues that genetic resources are not tangible resources but information. It shows that the existing preference for bilateralism and contracts reflects resistance on the part of many of the stakeholders involved in the CBD process to recognize them as such. ABS issues respond very well to the economics of information, yet as the author explains, these have been either sidelined or overlooked. At a time when the Nagoya Protocol on ABS has renewed interest in feasible policy options, the author provides a constructive and provocative critique. The institutional, policy and regulatory framework constitute "bounded openness" under which fairness and equity emerge.

Genetic Resources as Natural Information

Routledge

In the course of his distinguished career of over 55 years, Kenneth S Pitzer published over 360 scientific papers. Included in this volume are 72 papers, selected for their historical importance and continuing significance. In early work, where spectroscopic data were incomplete or, later on, where the systems of interest were so complex that a deductive solution from molecular information was impractical, Pitzer interrelated molecular structural information, statistical methods and thermodynamic measurements to advance the understanding

of molecular systems. This volume considers all three aspects and, by putting together selected papers, highlights the cohesiveness of certain advances through time and development. Several papers from journals not widely circulated can also be found in this selection of papers.

Psychological and Pedagogical Considerations in Digital Textbook Use and Development Elsevier

Neuropsychopharmacology of Psychosis: Relation of Brain Signals, Cognition and ChemistryFrontiers Media SA

Molten Salts Chemistry Newnes

Winner of the CHOICE Outstanding Academic Title 2017 Award This comprehensive collection of top-level contributions provides a thorough review of the vibrant field of chemistry education. Highly-experienced chemistry professors and education experts cover the latest developments in chemistry learning and teaching, as well as the pivotal role of chemistry for shaping a more sustainable future. Adopting a practice-oriented approach, the current challenges and opportunities posed by chemistry education are critically discussed, highlighting the pitfalls that can occur in teaching chemistry and how to circumvent them. The main topics discussed include best practices, project-based education, blended learning and the role of technology, including e-learning, and science visualization. Hands-on recommendations on how to optimally implement innovative strategies of

teaching chemistry at university and high-school levels make this book an essential resource for anybody interested in either teaching or learning chemistry more effectively, from experience chemistry professors to secondary school teachers, from educators with no formal training in didactics to frustrated chemistry students.

Publications of the National Institute of Standards and Technology ... Catalog CRC Press

Methanol: Science and Engineering provides a comprehensive review of the chemistry, properties, and current and potential uses and applications of methanol. Divided into four parts, the book begins with a detailed account of current production methods and their economics. The second part deals with the applications of methanol, providing useful insights into future applications. Modeling of the various reactor systems is covered in the next section, with final discussions in the book focusing on the economic and environmental impact of this chemical. Users will find this to be a must-have resource for all researchers and engineers studying alternative energy sources. Provides the latest developments on methanol research Reviews methanol production methods and their economics Outlines the use of methanol as an alternative green transportation fuel Includes new technologies and many new applications of methanol

Health Benefits of Fermented Foods and Beverages Neuropsychopharmacology of Psychosis: Relation of Brain Signals, Cognition and Chemistry

Analytical Chemistry in Space presents an

analysis of the chemical constitution of space, particularly the particles in the solar wind, of the planetary atmospheres, and the surfaces of the moon and planets. Topics range from space engineering considerations to solar system atmospheres and recovered extraterrestrial materials. Mass spectroscopy in space exploration is also discussed, along with lunar and planetary surface analysis using neutron inelastic scattering. This book is comprised of seven chapters and opens with a discussion on the possibilities for exploration of the solar system by mass spectroscopy, with particular reference to analysis of compositional data on solar system objects such as the Earth and meteorites, asteroids, comets, and interplanetary dust. The reader is then introduced to the project administration, instrument design, and spacecraft integration problems that must be solved to successfully fly a space experiment. The following chapters focus on the atmospheres of the sun and planets; the use of mass spectroscopy in solar system exploration and of neutron inelastic scattering in lunar and planetary surface analysis; and extraterrestrial in situ 14 MeV neutron activation analysis. The final chapter is devoted to the advantages and applications of thermal neutron activation to the analysis of certain samples of geological interest. This monograph will be a useful resource for analytical chemists and space scientists.

Analytical Chemistry in Space

Woodhead Publishing

Trends in Analytical Chemistry, Volume 12 focuses on the advancements of processes, technologies, automation, and applications of analytical chemistry. The selection first offers information on single-cell analysis at the level of a

single human erythrocyte and micellar catalysis in reaction-rate methods. Topics include analytical strategies, analysis of single erythrocytes, kinetic aspects of micellar catalysis, and micellar kinetic multicomponent determination. The text then takes a look at advances in the field of laser atomic spectroscopy and molecular recognition of sugars, including detection of sugar complexation, driving force and selectivity of sugar complexation, atomization/excitation source, and diagnostic tool. The manuscript examines charge-remote fragmentations for structural determination of lipids; advances in speciation analysis by capillary gas chromatography; and chemical pattern recognition and multivariate analysis for QSAR studies. The publication also ponders on in-vivo microdialysis sampling in pharmacokinetic studies; a novel single beam optical spectrophotometer for fast luminescence, absorption, and reflection measurements of turbid materials; and techniques for the study and characterization of advanced materials. The selection is a dependable reference for readers interested in the trends in analytical chemistry.

TRAC: Trends in Analytical Chemistry

Springer Science & Business Media

“Why do we grow old? . . . Verburgh tackles this age-old question . . . with

practical suggestions for how to slow down our biological clock." —David Ludwig, MD, PhD, #1 New York Times–bestselling author Do you know exactly how and why you age? And what you can do—whatever your current age—to slow that process and have a longer, healthier life? In The Longevity Code, medical doctor Kris Verburgh illuminates the biological mechanisms that make our bodies susceptible to heart attacks, dementia, diabetes, and other aging-related diseases. With the facts laid out, he provides the tools we need to slow down the aging process. His scientifically backed Longevity Staircase outlines a simple yet innovative step-by-step method offering better health and a longer life span– especially the crucial role of proper nutrition and exercise. But diet and exercise might not be the only way to crack the "longevity code": With each passing day, advances in biotechnology that were once the stuff of science fiction are emerging. Dr. Verburgh discusses how new types of vaccines, mitochondrial DNA, CRISPR proteins, and stem cells may help us slow and even reverse aging—now and in the future—and when paired with the right lifestyle, lead to longer, healthier lives than we've ever imagined. "Verburgh examines how we age and takes a valuable look at ethical issues surrounding the prevention of aging." —Library Journal

Publications of the National Bureau of Standards, 1979 Catalog Springer

"Everybody who has ever read a book will benefit from the way Keith Houston explores the most powerful object of our time. And

everybody who has read it will agree that reports of the book's death have been greatly exaggerated."—Erik Spiekermann, typographer We may love books, but do we know what lies behind them? In The Book, Keith Houston reveals that the paper, ink, thread, glue, and board from which a book is made tell as rich a story as the words on its pages—of civilizations, empires, human ingenuity, and madness. In an invitingly tactile history of this 2,000-year-old medium, Houston follows the development of writing, printing, the art of illustrations, and binding to show how we have moved from cuneiform tablets and papyrus scrolls to the hardcovers and paperbacks of today. Sure to delight book lovers of all stripes with its lush, full-color illustrations, The Book gives us the momentous and surprising history behind humanity's most important—and universal—information technology.

From Experimental Data to Practical Applications CRC Press

The sustainable use of natural resources is an important global challenge, and improved metal sustainability is a crucial goal for the 21st century in order to conserve the supply of critical metals and mitigate the environmental and health issues resulting from unrecovered metals. Metal Sustainability: Global Challenges, Consequences and Prospects discusses important topics and challenges associated with sustainability in metal life cycles, from mining ore to beneficiation processes, to product manufacture, to recovery from end-of-life materials, to environmental and health concerns resulting from generated waste. The broad perspective presented highlights the global interdependence of the many stages of metal life cycles.

Economic issues are emphasized and relevant environmental, health, political, industrial and societal issues are discussed. The importance of applying green chemistry principles to metal sustainability is emphasized. Topics covered include: • Recycling and sustainable utilization of precious and specialty metals • Formal and informal recycling from electronic and other high-tech wastes • Global management of electronic wastes • Metal reuse and recycling in developing countries • Effects of toxic and other metal releases on the environment and human health • Effect on bacteria of toxic metal release • Selective recovery of platinum group metals and rare earth metals • Metal sustainability from a manufacturing perspective • Economic perspectives on sustainability, mineral development, and metal life cycles • Closing the Loop – Minerals Industry Issues The aim of this book is to improve awareness of the increasingly important role metals play in our high-tech society, the need to conserve our metal supply throughout the metal life cycle, the importance of improved metal recycling, and the effects that unhindered metal loss can have on the environment and on human health.

The Longevity Code Springer Nature

Nothing provided

Development of Trans-free Lipid Systems and their Use in Food Products IGI Global

Authored by two longtime researchers in tobacco science, The Chemical Components of Tobacco and Tobacco

Smoke, Second Edition chronicles the progress made from late 2008 through 2011 by scientists in the field of tobacco science. The book examines the isolation and characterization of each component. It explores developments in pertinent analytical technology and results of experimental studies on biological activity, toxicity, and tumorigenicity, including the inhibition of adverse biological activity of one specific tobacco smoke component by another tobacco smoke component. Adding to the progress reported in the First Edition, the comprehensive Second Edition provides nearly 7,000 references on almost 9,600 components. The authors discuss the controversies over the extrapolation of the biological effect of a specific component administered individually by one route versus its biological effect when the component is in a highly complex mixture and is administered by a different route. They also cite studies in which cigarette design technologies were developed to control the per-cigarette mainstream smoke yield of Federal Trade Commission–defined tar and one or more specific tobacco smoke components of concern. New in the Second Edition: Approximately 1,000 newly reported components have been inserted and several dozen duplicates have been deleted from various tables and from the Alphabetical Index Improved and sharper chemical structures Insertion of new pertinent references for the components in each of the major chapter tables devoted to a particular functional component Updated Index organized by the CAS Registry

Number listing of the components Updated discussions in the Introduction and at the beginning of each chapter A searchable companion CD-ROM containing the 350-page alphabetical Component Index Authors Alan Rodgman and Thomas A. Perfetti were jointly awarded the 2010 CORESTA (Cooperative Centre for Scientific Research Relative to Tobacco) Prize for their extensive work on documenting the vast literature on the chemical composition of tobacco and tobacco smoke in their original edition.