



- 1.1 functional (group)
- 1.2 carbonyl
- 1.3 activation
- 1.4 electrolytic
- 1.5 anode

[5 x 1 =]

- 2.1 The eutrophication of fresh water is caused by high concentrations of nitrate ions from highly soluble nitrate salts in fertilizers; the resulting algal blooms that thrive on the nitrates lower the water's oxygen concentration.
- 2.2 An electrolytic cell is an electrochemical cell that converts electrical energy into chemical energy.
- 2.3 The Ostwald, and Contact processes are used in the chemical industry to produce important industrial acids.
- 2.4 Strong reducing agents release electrons easily and improve the reducing ability of chemical species that receive the electrons they release.
- 2.5 A bag of fertiliser marked 2 : 3 : 2 (28) tells us that nitrogen, phosphorus and potassium are present in the ratio of 8% : 12% : 8% of the total mass of fertiliser in the bag.

[5 x 2 =]

- 3.1 C
- 3.2 B
- 3.3 A
- 3.4 C
- 3.5 D

[5 x 2 =]

- 4.1 4.1.1 F
- 4.1.2 B
- 4.1.3 A

Physical Science Paper 2 2013 Memorandum

**Bob Sheil, Frédéric Migayrou, Luke
Pearson, Laura Allen**



Physical Science Paper 2 2013 Memorandum:

This Changes Everything Naomi Klein, 2014-09-16 The most important book yet from the author of the international bestseller *The Shock Doctrine* a brilliant explanation of why the climate crisis challenges us to abandon the core free market ideology of our time restructure the global economy and remake our political systems In short either we embrace radical change ourselves or radical changes will be visited upon our physical world The status quo is no longer an option In *This Changes Everything* Naomi Klein argues that climate change isn't just another issue to be neatly filed between taxes and health care It's an alarm that calls us to fix an economic system that is already failing us in many ways Klein meticulously builds the case for how massively reducing our greenhouse emissions is our best chance to simultaneously reduce gaping inequalities re-imagine our broken democracies and rebuild our gutted local economies She exposes the ideological desperation of the climate change deniers the messianic delusions of the would-be geoengineers and the tragic defeatism of too many mainstream green initiatives And she demonstrates precisely why the market has not and cannot fix the climate crisis but will instead make things worse with ever more extreme and ecologically damaging extraction methods accompanied by rampant disaster capitalism Klein argues that the changes to our relationship with nature and one another that are required to respond to the climate crisis humanely should not be viewed as grim penance but rather as a kind of gift a catalyst to transform broken economic and cultural priorities and to heal long-festered historical wounds And she documents the inspiring movements that have already begun this process communities that are not just refusing to be sites of further fossil fuel extraction but are building the next regeneration-based economies right now Can we pull off these changes in time Nothing is certain Nothing except that climate change changes everything And for a very brief time the nature of that change is still up to us

The Secure and the Dispossessed Nick Buxton, Ben Hayes, 2015-11-20 While the world's scientists and many of its inhabitants despair at the impact of climate change corporate and military leaders see nothing but opportunities For them melting ice caps mean newly accessible fossil fuels borders to be secured from climate refugees social conflicts to be managed and more failed states in which to intervene They are securing their assets at the expanse of the planet and its inhabitants *The Secure and the Dispossessed* looks at these deadly approaches with a critical eye It also considers the flip side that the legitimacy of the elite is under unprecedented pressure from resistance by communities to resource grabs to those creating new ecological and socially just models for managing our energy food and water Topics covered include geoengineering militarism refugee protection greenwashing and the agricultural crisis among others Adaptation and resilience to a climate-changed world is desperately needed but the form it will take will affect all of our futures

Indigenous Peoples' Governance of Land and Protected Territories in the Arctic Thora Martina Herrmann, Thibault Martin, 2015-12-22 This book addresses critical questions and analyses key issues regarding Indigenous Aboriginal Peoples and governance of land and protected areas in the Arctic It brings together contributions from scientists

indigenous and non indigenous researchers local leaders and members of the policy community that document Indigenous Aboriginal approaches to governance of land and protected areas at the local regional and international level explore new territorial governance models that are emerging as part of the Indigenous Aboriginal governance within Arctic States provinces territories and regions analyse the recognition or lack thereof concerning indigenous rights to self determination in the Arctic and examine how traditional decision making arrangements and practices can be linked with governments in the process of good governance The book highlights essential lessons learned success stories and remaining issues all of which are useful to address issues of Arctic governance of land and protected areas today and which could also be relevant for future governance arrangements

Biofuels for Aviation Christopher Chuck, 2016-06-02 Biofuels for Aviation Feedstocks Technology and Implementation presents the issues surrounding the research and use of biofuels for aviation such as policy markets certification and performance requirements life cycle assessment and the economic and technical barriers to their full implementation Readers involved in bioenergy and aviation sectors research planning or policy making activities will benefit from this thorough overview The aviation industry's commitment to reducing GHG emissions along with increasing oil prices have sparked the need for renewable and affordable energy sources tailored to this sector's very specific needs As jet engines cannot be readily electrified turning to biofuels is the most viable option However aviation is a type of transportation for which traditional biofuels such as bioethanol and biodiesel do not fulfill key fuel requirements Therefore different solutions to this situation are being researched and tested around the globe which makes navigating this scenario particularly challenging This book guides readers through this intricate subject bringing them up to speed with its current status and future prospects both from the academic and the industry point of view Science and technology chapters delve into the technical aspects of the currently tested and the most promising technology in development as well as their respective feedstocks and the use of additives as a way of adapting them to meet certain specifications Conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch are explored and their results are assessed for current and future viability Presents the current status of biofuels for the aviation sector including technologies that are currently in use and the most promising future technologies their production processes and viability Explains the requirements for certification and performance of aviation fuels and how that can be achieved by biofuels Explores the economic and policy issues as well as life cycle assessment a comparative techno economic analysis of promising technologies and a roadmap to the future Explores conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch

Bulk Collection of Signals Intelligence National Research Council, Division on Engineering and Physical Sciences, Computer Science and Telecommunications Board, Committee on Responding to Section 5(d) of Presidential Policy Directive 28: The Feasibility of Software to Provide Alternatives to Bulk Signals Intelligence Collection, 2015-03-24 The Bulk Collection of Signals Intelligence Technical Options study is a result of

an activity called for in Presidential Policy Directive 28 PPD 28 issued by President Obama in January 2014 to evaluate U S signals intelligence practices The directive instructed the Office of the Director of National Intelligence ODNI to produce a report within one year assessing the feasibility of creating software that would allow the intelligence community more easily to conduct targeted information acquisition rather than bulk collection ODNI asked the National Research Council NRC the operating arm of the National Academy of Sciences and National Academy of Engineering to conduct a study which began in June 2014 to assist in preparing a response to the President Over the ensuing months a committee of experts appointed by the Research Council produced the report Corporate Social Responsibility James Weber, David Wasieleski, 2018-05-14

Volume Two of Business and Society 360 focuses on research drawn from work grounded in corporate social responsibility and corporate citizenship **Twort's Water Supply** Malcolm J. Brandt, K. Michael Johnson, Andrew J. Elphinston, Don D. Ratnayaka, 2016-09-03 Twort's Water Supply Seventh Edition has been expanded to provide the latest tools and techniques to meet engineering challenges over dwindling natural resources Approximately 1.1 billion people in rural and peri urban communities of developing countries do not have access to safe drinking water The mortality from diarrhea related diseases amounts to 2.2 million people each year from the consumption of unsafe water This update reflects the latest WHO European UK and US standards including the European Water Framework Directive The book also includes an expansion of waste and sludge disposal including energy and sustainability and new chapters on intakes chemical storage handling and sampling Written for both professionals and students this book is essential reading for anyone working in water engineering Features expanded coverage of waste and sludge disposal to include energy use and sustainability Includes a new chapter on intakes Includes a new chapter on chemical storage and handling *Across Space and Time* Arianna Traviglia, 2025-10-01 This volume presents a selection of the best papers presented at the forty first annual Conference on Computer Applications and Quantitative Methods in Archaeology The theme for the conference was Across Space and Time and the papers explore a multitude of topics related to that concept including databases the semantic Web geographical information systems data collection and management and more **Robust Methods for the Analysis of Images and Videos for Fisheries Stock Assessment** National Research Council, Division on Engineering and Physical Sciences, Board on Mathematical Sciences and Their Applications, Committee on Applied and Theoretical Statistics, 2015-02-24 The National Marine Fisheries Service NMFS is responsible for the stewardship of the nation's living marine resources and their habitat As part of this charge NMFS conducts stock assessments of the abundance and composition of fish stocks in several bodies of water At present stock assessments rely heavily on human data gathering and analysis Automatic means of fish stock assessments are appealing because they offer the potential to improve efficiency and reduce human workload and perhaps develop higher fidelity measurements The use of images and video when accompanied by appropriate statistical analyses of the inferred data is of increasing importance for estimating the abundance of species and their age distributions Robust Methods for the Analysis of

Images and Videos for Fisheries Stock Assessment is the summary of a workshop convened by the National Research Council Committee on Applied and Theoretical Statistics to discuss analysis techniques for images and videos for fisheries stock assessment Experts from diverse communities shared perspective about the most efficient path toward improved automation of visual information and discussed both near term and long term goals that can be achieved through research and development efforts This report is a record of the presentations and discussions of this event

Overcoming Barriers to Deployment of Plug-in Electric Vehicles National Research Council,Transportation Research Board,Division on Engineering and Physical Sciences,Board on Energy and Environmental Systems,Committee on Overcoming Barriers to Electric-Vehicle Deployment,2015-06-26 In the past few years interest in plug in electric vehicles PEVs has grown Advances in battery and other technologies new federal standards for carbon dioxide emissions and fuel economy state zero emission vehicle requirements and the current administration s goal of putting millions of alternative fuel vehicles on the road have all highlighted PEVs as a transportation alternative Consumers are also beginning to recognize the advantages of PEVs over conventional vehicles such as lower operating costs smoother operation and better acceleration the ability to fuel up at home and zero tailpipe emissions when the vehicle operates solely on its battery There are however barriers to PEV deployment including the vehicle cost the short all electric driving range the long battery charging time uncertainties about battery life the few choices of vehicle models and the need for a charging infrastructure to support PEVs What should industry do to improve the performance of PEVs and make them more attractive to consumers At the request of Congress *Overcoming Barriers to Deployment of Plug in Electric Vehicles* identifies barriers to the introduction of electric vehicles and recommends ways to mitigate these barriers This report examines the characteristics and capabilities of electric vehicle technologies such as cost performance range safety and durability and assesses how these factors might create barriers to widespread deployment *Overcoming Barriers to Deployment of Plug in Electric Vehicles* provides an overview of the current status of PEVs and makes recommendations to spur the industry and increase the attractiveness of this promising technology for consumers Through consideration of consumer behaviors tax incentives business models incentive programs and infrastructure needs this book studies the state of the industry and makes recommendations to further its development and acceptance

The Science of Armour Materials Ian Crouch,2016-09-21 The Science of Armour Materials comprehensively covers the range of armor materials from steels and light alloys through glasses and ceramics to fibers textiles and protective apparel The book also discusses aspects of analytical and numerical modeling as well as laboratory based high strain rate testing and ballistic testing methodologies Each chapter is written from an international perspective including reviews of the current global literature and incorporates case studies that focus upon real life applications research outcomes and lessons learned The threat spectrum is restricted to small arms ammunition high velocity fragments and stab and spike attacks as well as blast loadings Features input from an editor who is an expert in his field Dr Ian Crouch the author of over 80

publications in his field with three patents to his name Provides systematic and comprehensive coverage of armor materials modeling and testing Offers a cross disciplinary approach that brings together expertise in materials science and defense engineering Discusses aspects of analytical and numerical modeling as well as laboratory based high strain rate testing and ballistic testing methodologies *Life-Cycle of Engineering Systems: Emphasis on Sustainable Civil Infrastructure* Jaap Bakker, Dan M. Frangopol, Klaas Breugel, 2016-11-18 This volume contains the papers presented at IALCCE2016 the fifth International Symposium on Life Cycle Civil Engineering IALCCE2016 to be held in Delft The Netherlands October 16 19 2016 It consists of a book of extended abstracts and a DVD with full papers including the Fazlur R Khan lecture keynote lectures and technical papers from all over the world All major aspects of life cycle engineering are addressed with special focus on structural damage processes life cycle design inspection monitoring assessment maintenance and rehabilitation life cycle cost of structures and infrastructures life cycle performance of special structures and life cycle oriented computational tools The aim of the editors is to provide a valuable source for anyone interested in life cycle of civil infrastructure systems including students researchers and practitioners from all areas of engineering and industry Device Circuit Co-Design Issues in FETs Shubham Tayal, Billel Smaani, Shiromani Balmukund Rahi, Samir Labiod, Zeinab Ramezani, 2023-08-22 This book provides an overview of emerging semiconductor devices and their applications in electronic circuits which form the foundation of electronic devices Device Circuit Co Design Issues in FETs provides readers with a better understanding of the ever growing field of low power electronic devices and their applications in the wireless biosensing and circuit domains The book brings researchers and engineers from various disciplines of the VLSI domain together to tackle the emerging challenges in the field of engineering and applications of advanced low power devices in an effort to improve the performance of these technologies The chapters examine the challenges and scope of FinFET device circuits 3D FETs and advanced FET for circuit applications The book also discusses low power memory design neuromorphic computing and issues related to thermal reliability The authors provide a good understanding of device physics and circuits and discuss transistors based on the new channel dielectric materials and device architectures to achieve low power dissipation and ultra high switching speeds to fulfill the requirements of the semiconductor industry This book is intended for students researchers and professionals in the field of semiconductor devices and nanodevices as well as those working on device circuit co design issues *Redefining Geek* Cassidy Puckett, 2022-04-20 A surprising and deeply researched look at how everyone can develop tech fluency by focusing on five easily developed learning habits Picture a typical computer geek Likely white male and someone you d say has a natural instinct for technology Yet after six years teaching technology classes to first generation low income middle school students in Oakland California Cassidy Puckett has seen firsthand that being good with technology is not something people are born with it s something they learn In *Redefining Geek* she overturns the stereotypes around the digitally savvy and identifies the habits that can help everyone cultivate their inner geek Drawing on observations and

interviews with a diverse group of students around the country Puckett zeroes in on five technology learning habits that enable tech savvy teens to learn new technologies a willingness to try and fail management of frustration and boredom use of models and the abilities to use design logic and identify efficiencies In *Redefining Geek* she shows how to measure and build these habits and she demonstrates how many teens historically marginalized in STEM are already using these habits and would benefit from recognition for their talent access to further learning opportunities and support in career pathways She argues that if we can develop recognize and reward these technological learning habits in all kids especially girls and historically marginalized racial and ethnic groups we can address many educational inequities and disparities in STEM Revealing how being good with technology is not about natural ability but habit and persistence *Redefining Geek* speaks to the ongoing conversation on equity in technology education and argues for a more inclusive technology learning experience for all students

Vibrio ecology, pathogenesis and evolution Rita R Colwell, Daniela Ceccarelli, 2014-10-24 Vibrios are Gram negative bacilli that occur naturally in marine estuarine and freshwater systems Some species include human and animal pathogens capable of causing gastroenteritis wound infections cholera and fatal septicemia Over the past decades cutting edge research on *Vibrio* genomics has promoted a tremendous advance in our knowledge of these pathogens Significant developments include the discovery of emerging epidemic clones tracking the spread of new strain variants and an intensified appreciation of the role of mobile genetic elements in antibiotic resistance spread as well as pathogenesis Furthermore improved understanding of the interaction of Vibrios with a variety of living organisms in the aquatic environment has documented the significant role of environmental reservoirs in their seasonal cycle favoring persistence of the pathogen during inter epidemic periods and enhancing disease transmission This Research Topic is dedicated to our current understanding in these areas and will bring together leading experts in the field to provide a deep overview of Vibrios ecology and evolution and will suggest the pathway of future research in this field

Drawing Futures Bob Sheil, Frédéric Migayrou, Luke Pearson, Laura Allen, 2016-11-11 *Drawing Futures* brings together international designers and artists for speculations in contemporary drawing for art and architecture Despite numerous developments in technological manufacture and computational design that provide new grounds for designers the act of drawing still plays a central role as a vehicle for speculation There is a rich and long history of drawing tied to innovations in technology as well as to revolutions in our philosophical understanding of the world In reflection of a society now underpinned by computational networks and interfaces allowing hitherto unprecedented views of the world the changing status of the drawing and its representation as a political act demands a platform for reflection and innovation *Drawing Futures* will present a compendium of projects writings and interviews that critically reassess the act of drawing and where its future may lie *Drawing Futures* focuses on the discussion of how the field of drawing may expand synchronously alongside technological and computational developments The book coincides with an international conference of the same name taking place at The Bartlett School of

Architecture UCL in November 2016 Bringing together practitioners from many creative fields the book discusses how drawing is changing in relation to new technologies for the production and dissemination of ideas *Near Soliton Evolution for Equivariant Schrodinger Maps in Two Spatial Dimensions* Ioan Bejenaru, Daniel Tataru, 2014-03-05 The authors consider the Schrödinger Map equation in 2+1 dimensions with values into S^2 This admits a lowest energy steady state Q namely the stereographic projection which extends to a two dimensional family of steady states by scaling and rotation The authors prove that Q is unstable in the energy space $\dot{H}^1$ However in the process of proving this they also show that within the equivariant class Q is stable in a stronger topology $X \subset \dot{H}^1$ Fluid Mechanics and Hydraulics Vedat Batu, 2024-05-27 Fluid Mechanics and Hydraulics Illustrative Worked Examples of Surface and Subsurface Flows presents the basic principles of fluid mechanics through the use of numerous worked examples Some readers may have interest only in the application parts of various principles without paying too much attention to the derivation details of equations Other readers may have interest both in derivation details and their applications As a result this book is designed to address both needs and most derivation details are included as example problems Therefore those who are not interested in the details of derivations may skip them without interrupting the effective use of the book It serves as an effective learning source for college students and as a teaching tool for instructors with an included solutions manual as well as for practicing professionals in the areas of fluid mechanics and hydraulics **Johnstone Triangle** Norman Reid, 2021-01-18 Chemistry is often seen as a difficult subject to understand This book focusses on the triangle model that Alex H Johnstone developed in the early 1980s Originally conceived in the context of making chemistry more accessible to a wider range of learners the model has been applied in almost every area of education in chemistry at all stages of learning In looking at why chemistry is difficult there are two central questions Firstly does the problem relate to the nature of chemistry and secondly does it relate to the way humans gain understanding Both were found to be important and the answers to the two questions were found to be connected The triangle model arose from sustained research into human learning The central finding from research is the critical role of working memory and the model rationalises so much evidence from chemistry education research as well as the repeated experiences of teachers of chemistry at all levels In order to understand chemistry it is essential to develop sound mental models of molecular reality It generates major implications for the way a chemistry curriculum should be constructed and the processes of teaching and learning in chemistry when the goal is focussed on understanding the key ideas Some of these implications are developed and pointers offered to more successful ways forward The power of the Johnstone Triangle lies in the way it offers clear directions for all involved in chemistry education It is hoped that this book will prove helpful to all involved in sharing the exciting story of the way humans have come to understand the molecular world one of the great examples of great human endeavour Salivary Bioscience Douglas A. Granger, Marcus K. Taylor, 2020-04-07 This book provides the first comprehensive overview of the emerging field of interdisciplinary salivary

bioscience It serves as a foundational reference guide to the collection analysis and interpretation of salivary data as well as its myriad applications in medicine surveillance and public health The ease and non invasive nature of saliva collection makes it highly useful in diverse fields such as pediatrics dentistry neuroscience psychology animal welfare and precision medicine This book introduces students and scientists alike to the vast potential of salivary bioscience in both research and practice

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