

M. Guo, Imperial College, London, UK

## Life Cycle Assessment (LCA) of Light-weight Eco-composites

Miao Guo's PhD thesis provides scientific insights into the environmental issues related to biocomposites based on starch-polyvinyl alcohol (PVOH) blends. The author contributes significantly to the methodological issues underlying the Life Cycle Assessment (LCA) modelling approach. As well as presenting complete LCA inventories using primary data from a variety of sources, Guo develops a new modelling approach incorporating the process-oriented biogeochemistry model Denitrification-Decomposition (DNDC) into site-specific LCA studies to simulate carbon and nitrogen dynamics in the wheat agro-ecosystem. This thesis addresses important LCA data quality issues by using comprehensive sensitivity and uncertainty analyses and has resulted in a large number of publications in internationally renowned journals.

### Features

► Nominated as an outstanding PhD thesis by Imperial College London ► Outlines novel experimental results such as physico-chemical parameters, biodegradability and energy recovery of starch-PVOH biocomposites under anaerobic digestion conditions ► Provides the basis for a large number of publications in internationally renowned journals

### Contents

Materials and Methods.- LCA of Wheat Agro-Eco-Systems.- LCA Case Studies of Starch-Based Foam.- End of Life Scenarios.- LCA of WBF Products Over Whole Life Cycles.- Sensitivity and Uncertainty Analysis.

### Fields of interest

Polymer Sciences; Environmental Chemistry; Biomaterials

### Target groups

Research

### Product category

Monograph

T. Inokuma, The Scripps Research Institute, La Jolla, CA, USA

## Development of Novel Hydrogen-Bond Donor Catalysts

This work describes novel, effective hydrogen-bond (HB) donor catalysts based on a known bifunctional tertiary amine-thiourea, a privileged structure, which has been proven to be one of the most widely used organocatalysts. These HB donor catalysts derived from quinazoline and benzothiadiazine were initially synthesized as novel HB donors with their HB-donating abilities being measured by analytical methods.

### Features

► Nominated as an outstanding Ph.D thesis by Kyoto University ► Includes many references and ample experimental procedures ► Written in a manner that can be easily understood also by researchers in fields of chemistry other than synthetic chemistry

### Contents

Introduction.- Development of HB donor catalysts.- Development and properties of novel HB donor catalysts.- Asymmetric Michael addition to alpha,beta-unsaturated imides catalyzed by HB donors.- Asymmetric Hydrazination of activated methylene compounds catalyzed by HB donors.- Development of hydroxy thiourea catalysts.- Asymmetric Michael addition of gamma-hydroxyenones and alkenylboronic acids.- Asymmetric Petasis Reaction of N-aryl-alpha-iminoamides and Alkenylboronates.- Conclusion.

### Fields of interest

Organic Chemistry; Medicinal Chemistry; Catalysis

### Target groups

Research

### Product category

Ph.D. Thesis

M. Schlesinger, University of Windsor, ON, Canada (Ed)

## Applications of Electrochemistry in Medicine

Medical Applications of Electrochemistry, a volume of the series Modern Aspects of Electrochemistry, illustrates the interdisciplinary nature of modern science by indicating the many current issues in medicine that are susceptible to solution by electrochemical methods. This book also suggests how personalized medicine can develop.

### Features

► Describes the use of electrochemistry in medicine ► Paves the way for personalized medicine ► Opens the vista to nanomedicine

### Contents

Applications of electrochemistry in medicine.- Applications of electrochemistry in the design and development of medical technologies and devices.- Intracoronary stents: Medical devices at the interface of biology and electrochemistry.- Screen printed electrodes open new vistas in sensing: Application to medical diagnosis.- Electrochemical glucose sensors and their application in diabetes management.- Electrochemistry of adhesion and spreading of lipid vesicles on electrodes.- Bioelectrochemistry and chalcogens.

### Fields of interest

Electrochemistry; Medicine/Public Health, general; Analytical Chemistry

### Target groups

Research

### Product category

Monograph

Due February 2013

2013. XVII, 520 p. 157 illus., 145 in color. (Springer Theses) Hardcover

► \*€ (D) 149,75 | € (A) 153,94 | sFr 186,50

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Due January 2013

2013. X, 487 p. 120 illus., 66 in color. (Modern Aspects of Electrochemistry, Volume 56) Hardcover

► \*€ (D) 139,05 | € (A) 142,94 | sFr 173,00

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ISBN 978-1-4614-6147-0



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J.-P. Piquemal, Sorbonne University, Paris, France;  
K. D. Jordan, University of Pittsburgh, PA, USA (Eds)

## From Quantum Mechanics to Force Fields

A Topical Collection from Theoretical Chemistry Accounts

The authors of this volume illustrate recent trends in the design and application of accurate force fields. 15 papers reflect the present questions including the strategies for (i) the inclusion of the polarization energy and (ii) an optimal parametrization of models. They highlight the directions to follow as new exciting fields of application emerge.

### Features

► Experts present recent trends in the design and application of accurate force fields ► Spin-off from the journal *Theoretical Chemistry Accounts* ► Now available in hardcover

### Contents

From the Contents: CL&P: A generic and systematic force field for ionic liquids modeling.- Optimization of the Explicit Polarization (X-Pol) Potential using a Hybrid Density Functional.- A coarse-grained model for  $\text{I}^2\text{-D}$ -glucose based on force matching.- A Distributed Point Polarizable Force Field for Carbon Dioxide.- The polarizing forces of water.- How Polarization Damping Affects Ion Solvation Dynamics.- Analytic gradient and molecular dynamics simulations using the fragment molecular orbital method with effective potentials.- Recent Applications and Developments of Charge Equilibration Force Fields for Modeling Dynamical Charges in Classical Molecular Dynamics Simulations.

### Fields of interest

Theoretical and Computational Chemistry; Atomic/Molecular Structure and Spectra; Physical Chemistry

### Target groups

Research

### Product category

Monograph

## Topics in Current Chemistry

Series editors: K. N. Houk, J.-M. Lehn, S. V. Ley, J. Thiem, H. Yamamoto, P. Vogel, C. A. Hunter, M. Venturi, C.-H. Wong, H. N. Wong, M. J. Krische, M. Olivucci

### Volume 313

R. M. Metzger, University of Alabama, Tuscaloosa, AL, USA (Ed)

## Unimolecular and Supramolecular Electronics II

Chemistry and Physics Meet at Metal-Molecule Interfaces

### Contents

Molecular Electronic Junction Transport: Some Pathways and Some Ideas, by Gemma C. Solomon, Carmen Herrmann and Mark A. Ratner.- Unimolecular Electronic Devices, by Robert M. Metzger and Daniell L. Mattern.- Active and Non-Active Large-Area Metal/Molecules/Metal Junctions, by Barbara Branchi, Felice C. Simeone and Maria A. Rampi.- Charge Transport in Single Molecular Junctions at the Solid/Liquid Interface, by Chen Li, Artem Mishchenko and Thomas Wandlowski. Tunneling Spectroscopy of Organic Monolayers and Single Molecules, by K. W. Hipps.- Single Molecule Logical Devices, by Nicolas Renaud, Mohamed Hliwa and Christian Joachim.-

### Fields of interest

Physical Chemistry; Applied and Technical Physics; Optical and Electronic Materials

### Target groups

Research

### Product category

Reviews

## Topics in Heterocyclic Chemistry

S. V. Ley, G. Mehta, R. Noyori, K. Nicolaou, A. Padwa, L. E. Overman, Editorial board: D. Enders, Series editors: B. U. Maes, S. Polanc, J. Cossy

### Volume 31

M. Schnürch, M. D. Mihovilovic, Vienna University of Technology, Austria (Eds)

## Metalation of Azines and Diazines

M. Schlosser: Reactions of Pyridines, Benzopyridines and Azapyridines with Organomagnesiums and Organolithiums.- F. Chevallerier • F.

### Features

► Heterocyclic chemistry is the biggest branch of chemistry covering two-third of the chemical literature ► The series covers hot topics of frontier research summarized by reputed scientists in the field ► Our review series is topic related Online version available on SpringerLink.com

### Contents

Reactions of Pyridines, Benzopyridines and Azapyridines with Organomagnesiums and Organolithiums.- Lithiations and Magnesiations on Quinoline and Isoquinoline.- Metalation Reactions of Pyridines, Quinolines and Isoquinolines with ate Bases and their Alkali Metal Salt-Modified Congeners.- Lithiations and Grignard Reactions on Pyrimidine and Quinazoline.- Other stoichiometric metalation reactions on Pyrimidine and Quinazoline - Borylation, Stannylation, Zincation, Silylation, etc.- Metalation of Pyrazine and Quinoxaline.- Metalation of Pyridazine, Cinnoline, and Phtalazine.

### Fields of interest

Organic Chemistry; Organometallic Chemistry

### Target groups

Research

### Product category

Reviews

Due January 2013

2013. 180 p. 37 illus., 12 in color. (Highlights in *Theoretical Chemistry*, Volume 3) Hardcover  
► approx. \*€ (D) 106,95 | € (A) 109,95 | sFr 133,50  
► approx. € 99,95 | £90.00  
ISBN 978-3-642-34449-7



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Available

2012. XI, 272 p. 129 illus., 71 in color. Hardcover  
► \*€ (D) 245,03 | € (A) 251,90 | sFr 305,00  
► € 229,00 | £206.50  
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Due December 2012

2013. X, 250 p. Hardcover  
► approx. \*€ (D) 203,25 | € (A) 208,94 | sFr 272,50  
► approx. € 189,95 | £171.00  
ISBN 978-3-642-35021-4



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N. Vogel, Harvard University, Cambridge, MA, USA

## Surface Patterning with Colloidal Monolayers

How can the two dimensional crystallization of colloids be used to form highly ordered colloidal monolayers on solid substrates? What application does this have in generating arrays of nanostructures? These questions are addressed in Nicolas Vogel's thesis. Vogel describes a simple preparation method for the formation of uniform colloidal crystals over large areas, which he refines to yield more complex binary and non-close-packed arrangements. These monolayers can be applied to a process termed colloidal lithography which is used to prepare high quality metallic nanostructures with tailored properties defined to suit a variety of applications. Moreover, the author describes a method used to create metallic nanodot arrays with a resolution unprecedented for colloidal lithography methods.

### Features

► Nominated by the Max-Planck Institute for Polymer Research as an outstanding PhD thesis ► Describes a method used to embed nanoparticle arrays into the substrate, which is developed and used to design robust, re-usable biosensor platforms and nanoscale patterns of biomimetic lipid bilayer membranes ► Forms the basis of a large number of publications in internationally renowned journals

### Contents

Introduction.- Motivation and Outline.- Theory.- Characterization Methods.- Results and Discussion.- Experimental Section.- Summary and Outlook.

### Fields of interest

Polymer Sciences; Nanotechnology; Nanoscale Science and Technology

### Target groups

Research

### Product category

Monograph

Due December 2012

2013. XVI, 250 p. 128 illus., 75 in color. (Springer Theses) Hardcover

► \*€ (D) 106,95 | € (A) 109,95 | sFr 133,50

► € 99,95 | £90.00

ISBN 978-3-642-35132-7



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