

# Chem Soc Rev

Chemical Society Reviews

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## IN THIS ISSUE

ISSN 0306-0012 CODEN CSRVBR 41(21) 6849-7324 (2012)



### Cover

See Simone Fabiano and Bruno Pignataro, pp. 6859–6873. Image reproduced by permission of Bruno Pignataro from *Chem. Soc. Rev.*, 2012, **41**, 6859.



### Inside cover

See Heriberto Diaz Velazquez and Francis Verpoort, pp. 7032–7060. Image reproduced by permission of Francis Verpoort from *Chem. Soc. Rev.*, 2012, **41**, 7032.

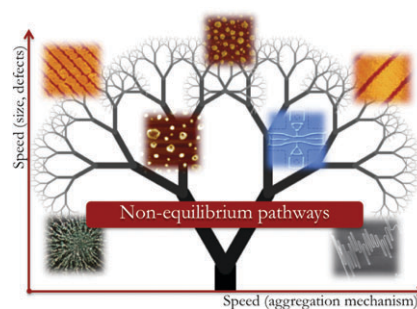
## TUTORIAL REVIEWS

6859

### Selecting speed-dependent pathways for a programmable nanoscale texture by wet interfaces

Simone Fabiano and Bruno Pignataro\*

The picture shows speed as a threshold factor for the dynamic adaptation of supramolecular structures at surfaces. By moving within the tree branches, it can allow selecting different aggregation mechanisms along with a diverse shape, dimensionality and complexity of the structures as well as modulating their size and defectivity.

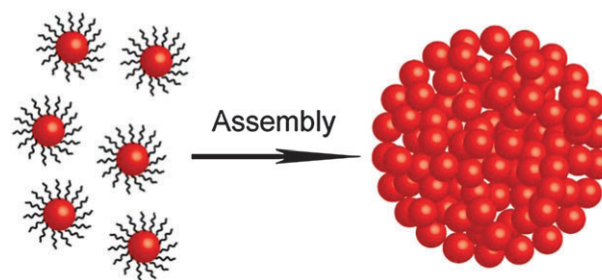


6874

### Colloidal nanoparticle clusters: functional materials by design

Zhenda Lu and Yadong Yin\*

Colloidal nanoparticles are assembled into various secondary cluster structures which possess new collective properties and integrated multi-functions.



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## Chem Soc Rev

## Chemical Society Reviews

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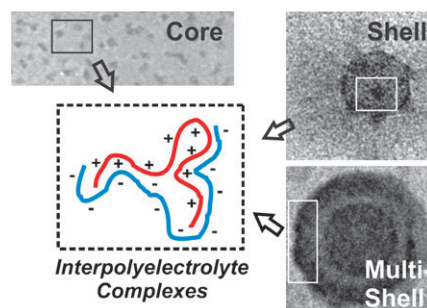
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6888

### Micellar interpolyelectrolyte complexes

Dmitry V. Pergushov, Axel H. E. Müller and Felix H. Schacher\*

The formation of micellar interpolyelectrolyte complexes represents a powerful tool for the directed assembly of charged macromolecules and the build-up of complex architectures.

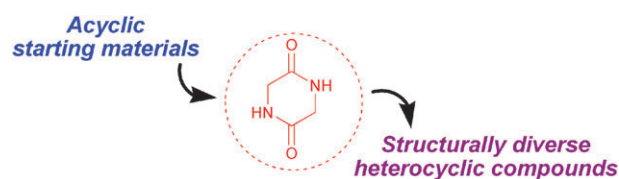


6902

### Privileged scaffolds in synthesis: 2,5-piperazinediones as templates for the preparation of structurally diverse heterocycles

Juan F. González, Irene Ortín, Elena de la Cuesta and J. Carlos Menéndez\*

Diketopiperazines are key intermediates in the generation of heterocycles endowed with structural diversity and complexity.

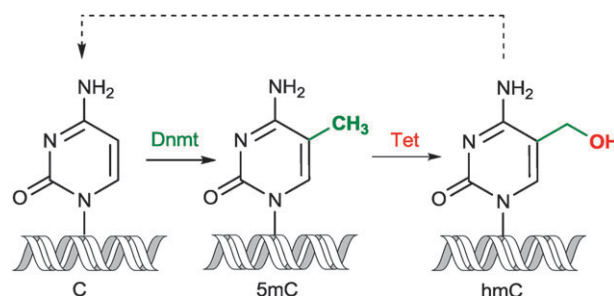


6916

### 5-Hydroxymethylcytosine – the elusive epigenetic mark in mammalian DNA

Edita Kriukienė, Zita Liutkevičiūtė and Saulius Klimašauskas\*

This review discusses chemical and biological aspects of the occurrence of 5-hydroxymethylcytosine – the recently discovered sixth base in mammalian DNA.



6931

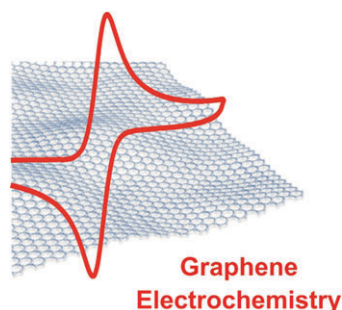
### Cooperative bimetallic catalysis in asymmetric transformations

Jongwoo Park and Sukwon Hong\*

This tutorial review highlights recent advances in cooperative bimetallic catalysts which have been developed for various asymmetric transformations.



6944

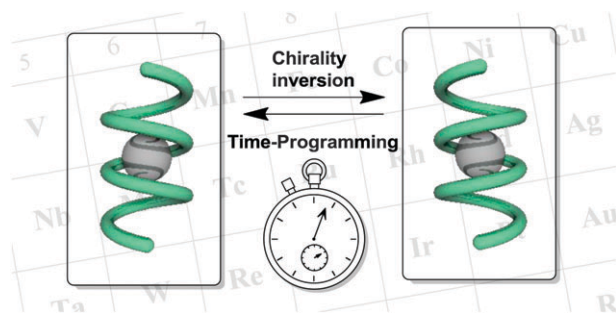


### Graphene electrochemistry: fundamental concepts through to prominent applications

Dale A. C. Brownson, Dimitrios K. Kampouris and Craig E. Banks\*

Insights into the recent fundamental understanding of graphene modified electrodes is given, assisting those exploring graphene in electrochemical areas (or those who wish to start to) and making electrochemical characterisation accessible to those in other fields; recent developments in prominent applications are also highlighted.

6977

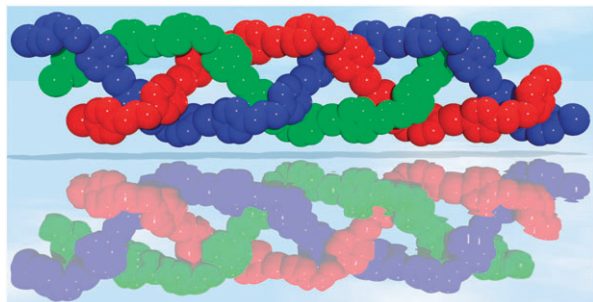


### Coordination chemistry strategies for dynamic helicates: time-programmable chirality switching with labile and inert metal helicates

Hiroyuki Miyake\* and Hiroshi Tsukube

This *tutorial review* highlights coordination chemistry strategies for development of structurally and functionally defined metal helicates.

6992

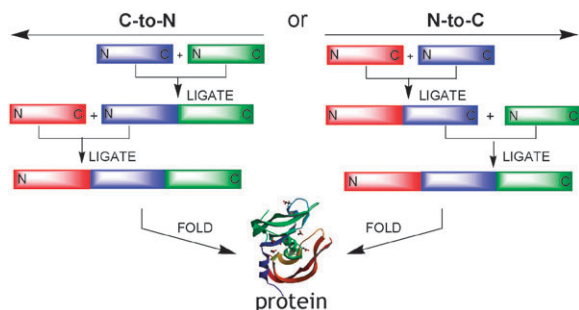


### Molecular braids in metal–organic frameworks

Guo-Ping Yang, Lei Hou, Xin-Jun Luan, Biao Wu and Yao-Yu Wang\*

This Tutorial Review mainly summarizes the recent developments about the molecular braids in metal–organic frameworks.

7001



### Sequential native peptide ligation strategies for total chemical protein synthesis

Laurent Raibaut, Nathalie Ollivier and Oleg Melnyk\*

The protein chemist is faced with very different synthetic challenges with the choice of assembling in the C-to-N or N-to-C direction.



## TUTORIAL REVIEWS

7016

**Nanoporous metals: fabrication strategies and advanced electrochemical applications in catalysis, sensing and energy systems**

Jintao Zhang and Chang Ming Li\*

This tutorial review updates the significant progress towards the fabrication strategies of nanoporous metals as well as their advanced electrochemical applications in electrocatalysis, sensing, and electrochemical energy systems.



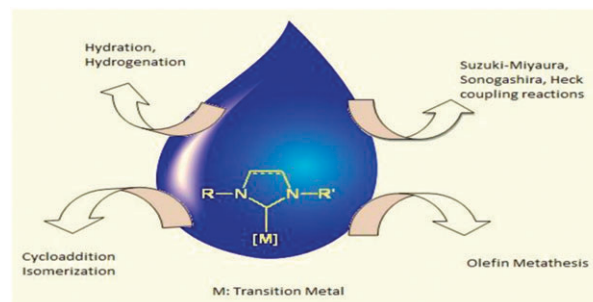
## CRITICAL REVIEWS

7032

**N-heterocyclic carbene transition metal complexes for catalysis in aqueous media**

Heriberto Diaz Velazquez and Francis Verpoort\*

From organic to aqueous media for catalysis using NHC-transition metal complexes.

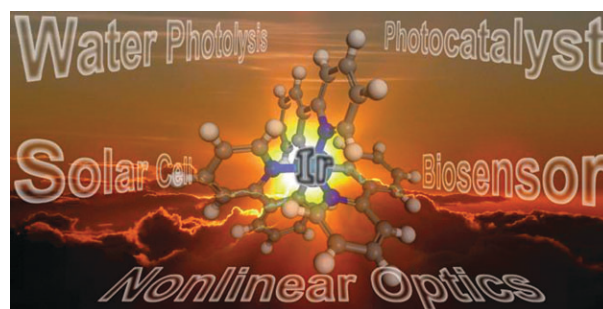


7061

**Photofunctional triplet excited states of cyclometalated Ir(III) complexes: beyond electroluminescence**

Youngmin You\* and Wonwoo Nam\*

Principles of triplet state photofunctionalities of cyclometalated Ir(III) complexes are explained with recent examples of a variety of photoelectronic applications.

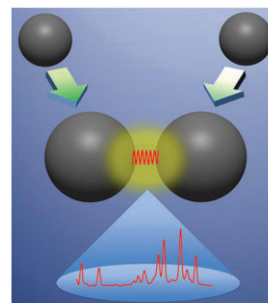


7085

**Molecularly-mediated assemblies of plasmonic nanoparticles for Surface-Enhanced Raman Spectroscopy applications**

Luca Guerrini and Duncan Graham\*

A review of approaches involving nanoparticle assembly in suspension using defined chemical and biochemical species for SERS applications.



“ I need to know  
the structure of  
this compound ”

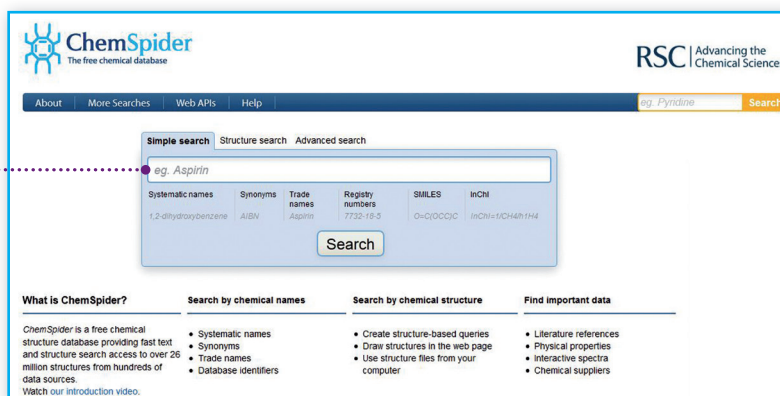
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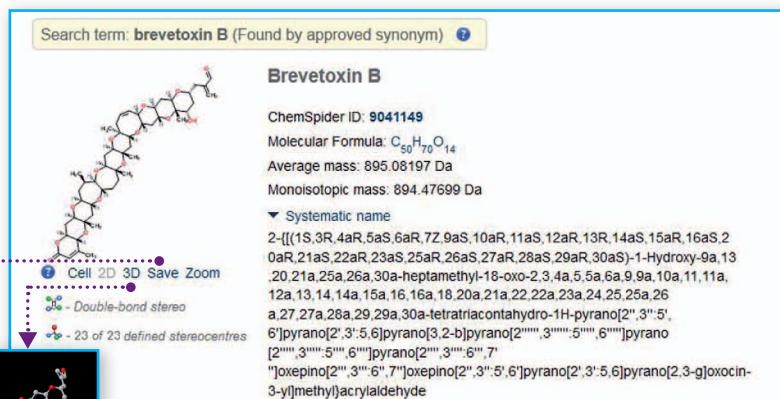
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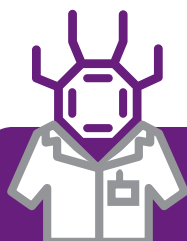
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## CRITICAL REVIEWS

7108

**Deep eutectic solvents: syntheses, properties and applications**

Qinghua Zhang, Karine De Oliveira Vigier, Sébastien Royer and François Jérôme\*

Deep Eutectic Solvents (DES) are an emerging new class of solvents that are highly attractive for the design of eco-efficient processes.

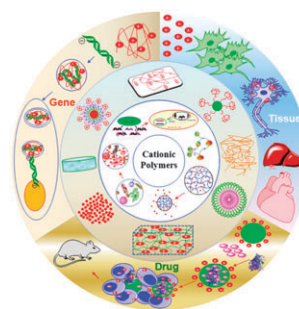


7147

**Cationic polymers and their therapeutic potential**

Sangram Keshari Samal,\* Mamoni Dash, Sandra Van Vlierberghe, David L. Kaplan, Emo Chiellini, Clemens van Blitterswijk, Lorenzo Moroni and Peter Dubruel\*

An overview of the inherent bioactive properties, architectures and therapeutic applications of cationic polymers.

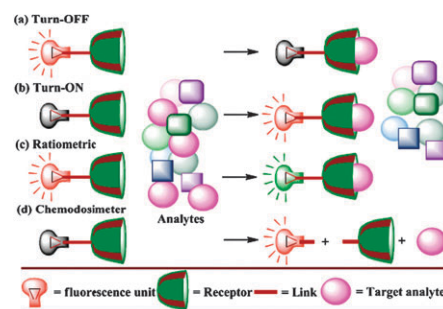


7195

**Iron(III) selective molecular and supramolecular fluorescent probes**

Suban K Sahoo,\* Darshna Sharma, Rati Kanta Bera, Guido Crisponi and John F Callan\*

This critical review focuses on the various molecular and supramolecular fluorescent probes developed for the selective detection and quantification of iron(III).

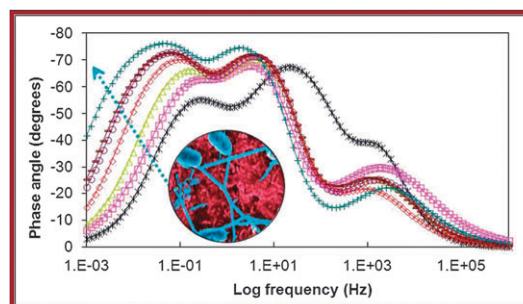


7228

**The accurate use of impedance analysis for the study of microbial electrochemical systems**

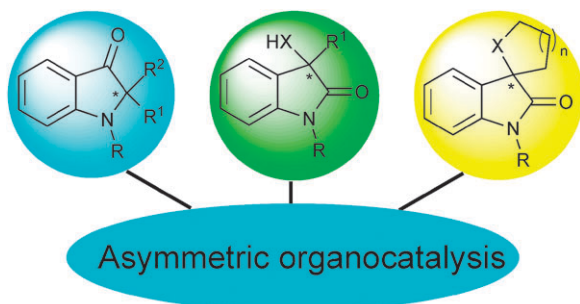
Xochitl Dominguez-Benetton,\* Surajbhan Sevda, Karolien Vanbroekhoven and Deepak Pant

This critical review evaluates the state-of-the-art progress in the use, analysis and interpretation of Electrochemical Impedance Spectroscopy (EIS) applied to the study of microbial electrochemical systems, aimed at improving the understanding of these systems and presenting guidelines for extracting original meaningful parameters thereof.



## CRITICAL REVIEWS

7247

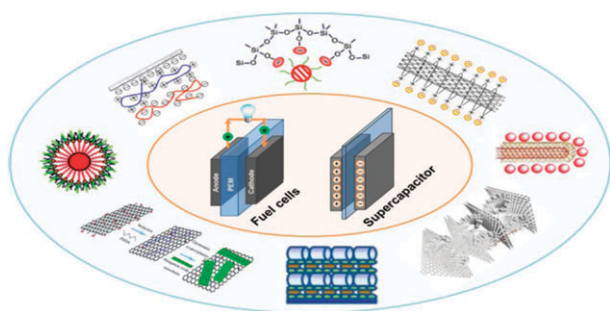


### Recent advances in organocatalytic methods for the synthesis of disubstituted 2- and 3-indolinones

Renato Dalpozzo,\* Giuseppe Bartoli and Giorgio Bencivenni

In recent years, organocatalysis has enhanced its importance as a tool for the synthesis of enantiomerically enriched compounds. Among the candidates for organocatalysis, the construction of asymmetric quaternary carbons is regarded as a challenging problem in organic synthesis.

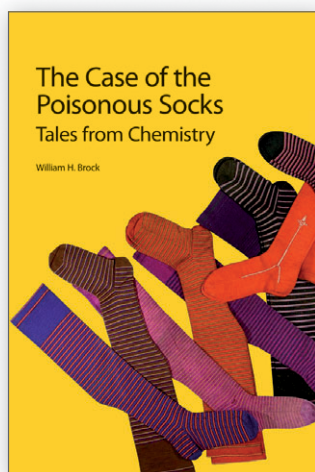
7291



### Layer-by-layer self-assembly in the development of electrochemical energy conversion and storage devices from fuel cells to supercapacitors

Yan Xiang,\* Shanfu Lu and San Ping Jiang\*

This critical review highlights the simplicity and versatility of layer-by-layer self-assembly technique within the application of fuel cells and supercapacitors.



## The Case of the Poisonous Socks

Tales from Chemistry

William H. Brock

Written by a respected science historian and established author, this collection of essays touches on all aspects of chemistry. It contains 42 tales about chemists and their discoveries from the nineteenth and twentieth centuries. The title is taken from the lead chapter which describes how respected chemist, William Crookes, solved a mystery from the 1860s of how brilliantly coloured socks were causing the feet of unfortunate wearers to swell. Other topics covered include: the quirky beliefs of American philanthropist, George Hodgkins; the development of the chemical laboratory since the 1830s; and the career of C.P. Snow before he became a novelist.

Light in style, and presented as a series of unconnected vignettes, the book will interest chemists, teachers, historians and anyone with an interest in science.

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