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IN THIS ISSUE

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Cover

Nanostructured assemblies. The cover illustration depicts several of the core-shell fluorescent silica nanoparticle architectures developed in the Wiesner group, building towards the central concept of a multifunctional, modular “lab on a particle.” Confocal fluorescence microscopy images from our initial work highlight several applications of these particles in biological imaging and biochemical sensing. Image reproduced by permission of Ulrich Wiesner *et al.*, *Chem. Soc. Rev.*, 2006, 35, 1028.

CHEMICAL SCIENCE

C81

Drawing together the research highlights and news from all RSC publications, *Chemical Science* provides a ‘snapshot’ of the latest developments across the chemical sciences showcasing newsworthy articles, as well as the most significant scientific advances.

Chemical Science

November 2006/Volume 3/Issue 11

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EDITORIAL

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Nanostructured assemblies

Guest editors Wilhelm Huck, Fabio Biscarini and Jon Preece discuss recent developments in nanostructured materials research and introduce the reviews in this special issue of *Chemical Society Reviews* on nanostructured assemblies.



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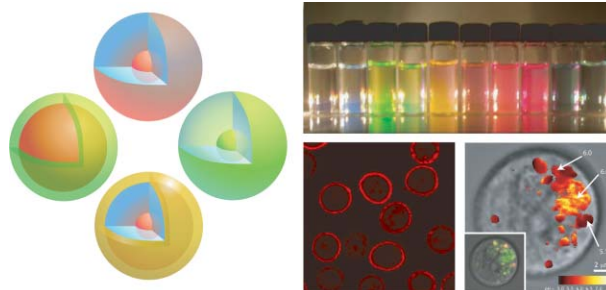
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Fluorescent core–shell silica nanoparticles: towards “Lab on a Particle” architectures for nanobiotechnology

Andrew Burns, Hooisweng Ow and Ulrich Wiesner*

Fluorescent core–shell silica nanoparticles present a promising materials platform for the development of multi-functional tools for nanobiotechnology. We review recent work to show the versatility of silica and the promise of the core–shell architecture towards the development of “Lab on a Particle” architectures.

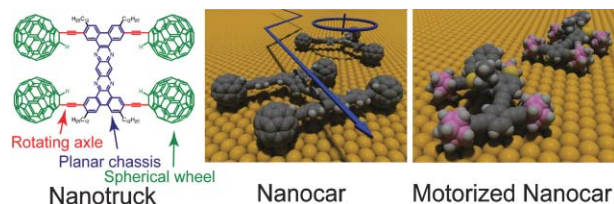


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Recent progress on nanovehicles

Yasuhiro Shirai, Jean-François Morin, Takashi Sasaki, Jason M. Guerrero and James M. Tour*

Design, synthesis (assembly), and testing (driving) of a new class of molecular nanovehicles including nanotrucks, nanocars, and motorized nanocars are presented.

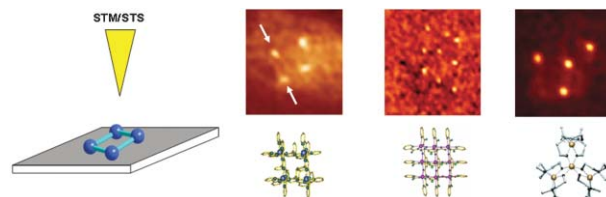


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Addressing metal centres in supramolecular assemblies

Mario Ruben,* Jean-Marie Lehn and Paul Müller

A general room temperature scanning tunnelling spectroscopy (STS) protocol, current induced tunnelling spectroscopy (CITS), was applied to free-standing 1D and 2D arrangements of supramolecular metal ion assemblies rendering local tunnelling probabilities with submolecular resolution.

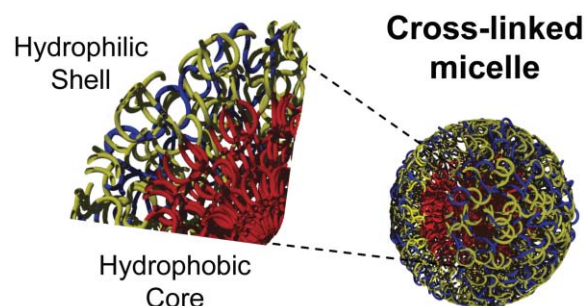


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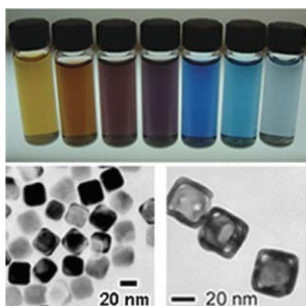
Cross-linked block copolymer micelles: functional nanostructures of great potential and versatility

Rachel K. O'Reilly,* Craig J. Hawker and Karen L. Wooley

This tutorial review will highlight the scope of work reported on the synthesis functionalisation and application of cross-linked block copolymer micelles.



1084

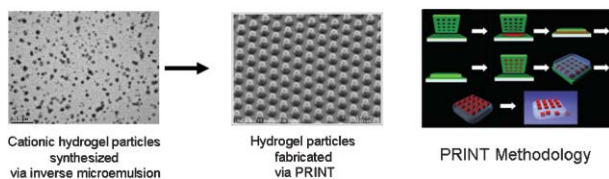


Gold nanostructures: engineering their plasmonic properties for biomedical applications

Min Hu, Jingyi Chen, Zhi-Yuan Li, Leslie Au, Gregory V. Hartland, Xingde Li, Manuel Marquez and Younan Xia*

The surface plasmon resonance peaks of gold nanostructures can be tuned from the visible to the near infrared region by controlling the shape and structure (solid vs. hollow).

1095

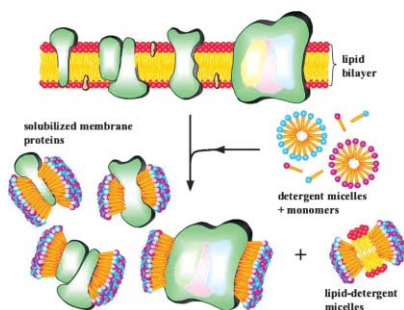


Imparting size, shape, and composition control of materials for nanomedicine

Larken E. Euliss, Julie A. DuPont, Stephanie Gratton and Joseph DeSimone

Organic nanoparticles: transitioning from polydisperse to size- and shape-specific drug delivery vehicles utilizing engineering techniques.

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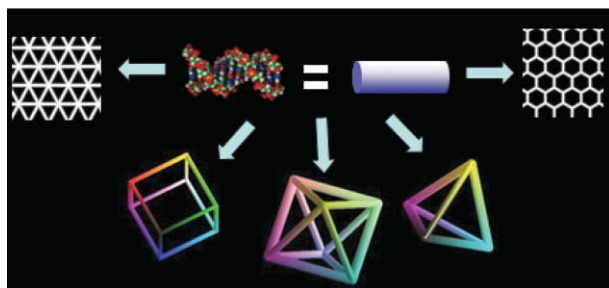


Molecular designer self-assembling peptides

Xiaojun Zhao and Shuguang Zhang

Building block designer peptide motifs are structurally simple and versatile for a broad spectrum of applications.

1111



First blueprint, now bricks: DNA as construction material on the nanoscale

Sethuramasundaram Pitchiaya and Yamuna Krishnan*

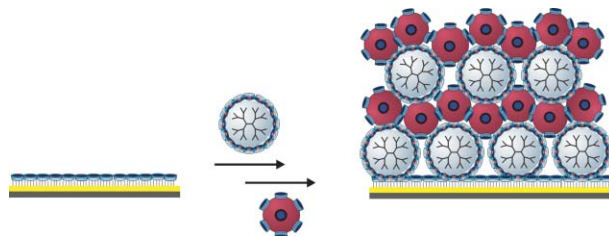
The art of constructing 1D, 2D and 3D frameworks using the physical property of rigid DNA 'rods' and the chemical 'glue' of base-pairing.

1122

Molecular printboards: versatile platforms for the creation and positioning of supramolecular assemblies and materials

Manon J. W. Ludden, David N. Reinhoudt and Jurriaan Huskens*

Receptor-modified surfaces (molecular printboards) are interfaces to which entities bind through multivalent interactions, allowing nanofabrication schemes such as layer-by-layer assembly

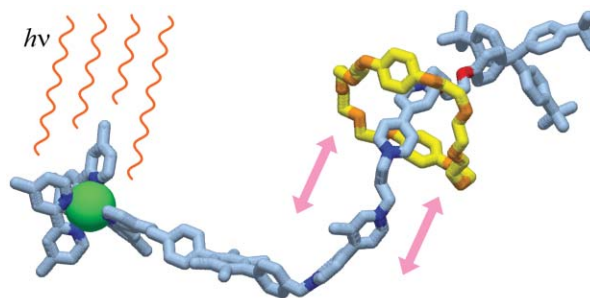


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Artificial nanomachines based on interlocked molecular species: recent advances

Vincenzo Balzani, Alberto Credi,* Serena Silvi and Margherita Venturi

Will nanomachines revolutionise our life? Not soon, however chemists have been learning how to construct simple prototypes of molecular shuttles, elevators, muscles and rotary motors

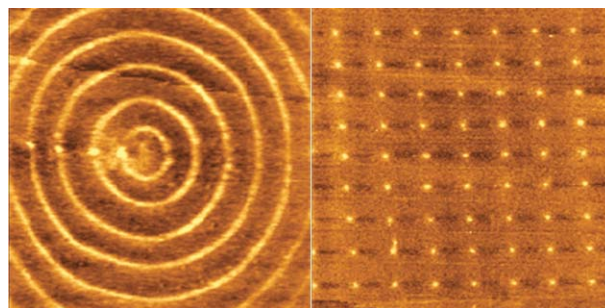


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Scanning near-field photolithography—surface photochemistry with nanoscale spatial resolution

Graham J. Leggett

Near-field photolithographic methods offer the possibility of selective initiation of surface chemical transformations with exquisite spatial resolution.



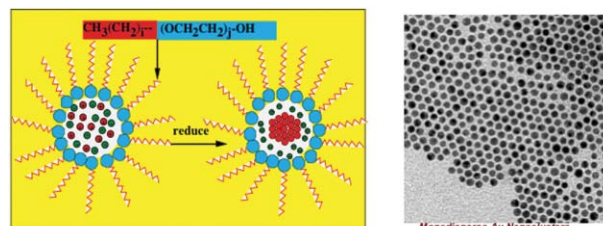
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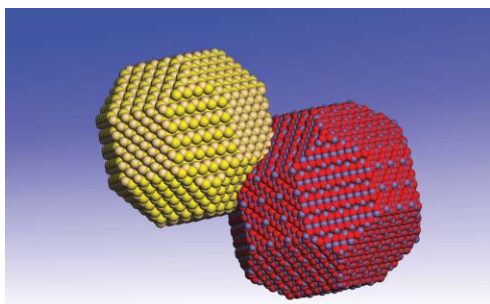
Synthesis, structure and properties of metal nanoclusters

J. P. Wilcoxon* and B. L. Abrams

We review metal nanocluster synthesis methods and demonstrate how characterization methods provide feedback for improved synthetic protocols. We discuss size-dependent physical and chemical properties of metal clusters and their arrays.



Metal ions (red and green) are solubilized inside droplet-like inverse micelles in oil (yellow) and chemically reduced to form metal clusters (red).



Synthesis, properties and perspectives of hybrid nanocrystal structures

Pantaleo Davide Cozzoli, Teresa Pellegrino and Liberato Manna*

A new generation of nanocrystals in which domains of different inorganic materials are assembled together might open new scenarios in nanotechnology.

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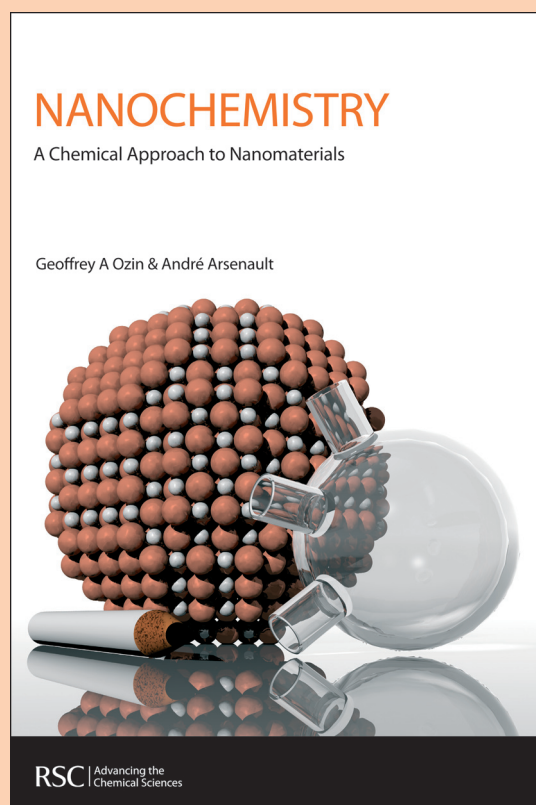
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