Polyoxometalate Chemistry For Nano Composite Design

Polyoxometalate Chemistry For Nano Composite Design-Toshihiro Yamase 2006-04-28 "Chemists from several international polyoxometalate research groups discussed recent results, including: controlled self-organization processes for the preparation of nano-composites; electronic interactions in magnetic mixed-valence cryptands and coronands; synthesis of the novel polyoxometalates with topological or biological significance; systematic investigations in materials science. It became evident during the symposium that the rapidly growing field of polyoxometalates has important properties pertinent to nano-composites. It is therefore easy for polyoxometalate chemists to envisage a "bottom-up" approach for design starting from individual small-size molecules and moieties which possess their own functionalities relevant to electronic/magnetic devices (ferromagnetism, semiconductor, proton-conductivity, and display), medicines (antimicrobials, and anti-microbialactivities), and catalysis.

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Self-Organized Nanoscale Materials-Motonari Adachi 2006-05-10 First to review nanoscale self-assembly employing such a bottom-up approach by a chemist, this book provides a well-rounded introduction to the field.


Chemistry of Nanoscale Materials: Applications of Nanoscale Self-Assembly-Ángel Martínez 2011-01-13 This volume is the result of the work of over 200 international researchers and is the most comprehensive work available on the field of nanotechnology, covering both theoretical and experimental aspects. The objective is to provide a tool for both researchers and teachers interested in self-assembly and nanotechnology.


Handbook on the Physics and Chemistry of Rare Earths- 2011-09-22 This continuing authoritative series deals with the chemistry, physics, and technology of the rare-earth elements in an integrated manner. Each chapter is a comprehensive, up-to-date, critical review of a particular segment of the rare earths' chemistry.

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Nanomaterials and Nanocomposites, Nanostructure Surfaces, and Their Applications
Olena Fesenko

Other materials are considered nanostructured because of their composition and internal organization. These materials find important applications in catalysis, electronics, and optoelectronics.

Nanostructured Catalysts - Susannah L. Scott 2008-04-06

With the recent advent of nanotechnology, research and development are taking place at an unprecedented rate. Innovative tools to fabricate, manipulate, characterize and evaluate such materials are being developed and enhanced. Today, one can fabricate electrically flexible, thin and buried between bulk liquid phases. Therefore, in order to study the liquid-liquid interface, the invention of innovative measurement methods has a primary importance.

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The hallmark of the liquid-liquid interface on the earth might be as old as that of the liquid. It is plausible that the generation of the primitive cell membrane is responsible for an accidental advent of the oldest liquid interfaces, since various compounds can be adsorbed by an absorption. The presence of liquid-liquid interfaces means that real liquids are far from ideal liquids to be miscible with any kind of liquid and that it has been of obvious real importance to study the non-ideal properties of liquids and their interfaces. It is not trivial that the non-ideality of liquids might generate the liquid-liquid interface and that biological systems might be generated from the non-ideal interfaces. The liquid-liquid interface has been, therefore, studied as a model of biological membrane. In pairing two phases of gas, liquid and solid, nine different pairs can be obtained, which include three homo-pairs of gas-gas, liquid-liquid and solid-solid pairs. This book presents an overview of progress in the field through recent results.

Nanotechnology Information Devices - NID Initiative 2009-03-15

The combination of biological and electronic units for sensor applications inspired by biological signal processes, scientists and engineers are exploring ways of manipulating, assembling and controlling biomolecules and cells on electronic devices. The overall goal is to create biosensor devices for bioanalysis, drug discovery, and curing diseases, but also to build new electronic systems based on biosensorically inspired concepts. This research area called bioelectronics produces an interdisciplinary and transdisciplinary approach to bio and electronic science, the invention of innovative measurement methods has a primary importance.

Surface Effects in Magnetic Nanoparticles - Dino Fiorani 2006-06-09

A collection of articles on different approaches to the investigation of surface effects on nanostructured magnetic materials, with special emphasis on magnetic nanoparticles. The book provides an overview of progress in the field through recent results.

Flexible, Thin and Buried Between Bulk Liquid Phases: Liquid-Liquid Interfaces and Their Control - Dino Fiorani 2006-06-09

A collection of articles on different approaches to the investigation of surface effects on nanostructured magnetic materials, with special emphasis on magnetic nanoparticles. The book provides an overview of progress in the field through recent results.

Nanotechnology and the long list of references in each chapter are a big plus for course tutors. The book is organized into seven sections. The first, nanoscale fabrication and characterization, covers nanolithography, self-assembly, and scanning probe microscopy. Of these, we enjoyed the section on nanolithography most, as it includes many interesting details from industrial manufacturing processes. The chapter on self-assembly also provides an excellent overview by introducing six types of intermolecular interactions and the ways these can be employed to fabricate nanoscale structures. The second section covers nanomaterials and nanodevices. Out of its 110 pages, 45 are devoted to carbon nanotubes. Fullerenes and quantum dots each have several chapters dedicated to their own characteristics and the materials themselves. The chapter on DNA and nanoscale electronics with a history of microelectronics before discussing the difficulties in shrinking transistor size further. The discussion of problems (leakage current, hot electrons, doping fluctuations, etc.) and possible solutions (high-k dielectrics, double-gate devices) could easily motivate deeper discussions of nanoscale electronic structures. A chapter on molecular electronics considers difficulties in molecular transistors, and DNA as a simple, qualitative measure of nanoscale electronics. These sections are examined in the fourth section. The concept of quantum nanotechnology is nicely presented, although the discussion of how this can be achieved with controlled spin states is (perhaps) not clearly written. We found the chapter on magnetic storage to be one of the most lucid in the book. The giant magnetoresistive effect, operation of spin valves, and issues in magnetic scaling are easier to understand when placed in the context of the modern magnetic hard disk drive. Micro- and nanoelectromechanical systems are covered with an emphasis on the integration of sensing, computation, and communication. Here, the student must have advanced applications of lithography. The sixth section, nanophotonics, provides a brief introduction to quantum confined semiconductor nanocrystals and novel concepts of quantum light. The seventh section, nanoelectronics, is devoted to the basic science of building electronic nanodevices and nanosystems.
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