



Semiconductor Nanocrystals

P. Samokhvalov, M. Artemyev,* I. Nabiev*

Basic Principles and Current Trends in Colloidal Synthesis of Highly Luminescent Semiconductor Nanocrystals

Joining the (quantum) dots: Recent progress in the synthesis of highly luminescent CdSe, CdS, ZnSe, and other A^{II}B^{VI} core-shell colloidal quantum dots and the influence of the core structure and the core-shell interface on their luminescence quantum yield (see figure) is reported in this Minireview. Short- and long-term prospects for the development of techniques for producing fluorescent quantum dots for biological and technological applications are discussed.



Chem. Eur. J.
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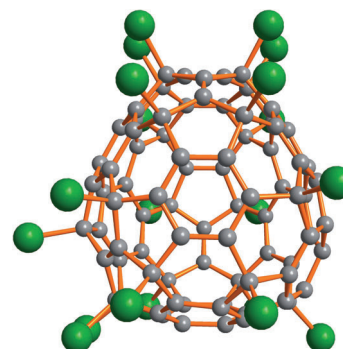


Fullerenes

S. F. Yang,* T. Wei, S. I. Troyanov*

A New Isomer of Pristine Higher Fullerene C₅-C₈₂ (4) Captured by Chlorination as C₈₂Cl₂₀

A new isomer of a higher fullerene, C₅-C₈₂ (no. 4), has been discovered as a chloride, C₈₂Cl₂₀ (see picture: C gray, Cl green). It was obtained by chlorination of a C₈₂/C₈₄ mixture with VCl₄ and investigated by single-crystal X-ray diffraction using synchrotron radiation.



Chem. Asian J.
DOI: 10.1002/asia.201201038

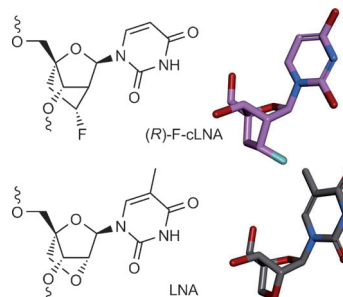


Nucleic Acids

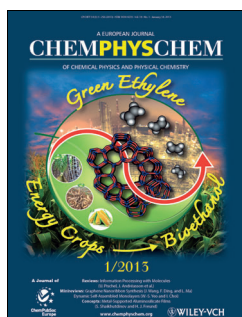
P. P. Seth,* P. S. Pallan, E. E. Swayze, M. Egli

Synthesis, Duplex Stabilization and Structural Properties of a Fluorinated Carbocyclic LNA Analogue

DNA oligonucleotides modified with nucleoside monomers which have an electron withdrawing group (EWG) at the 2'-position of the furanose ring form more stable duplexes with complementary RNA as compared to unmodified DNA. Here we show that an anti-periplanar orientation of the nucleobase and the 2'-EWG is important for optimal duplex stabilization even for nucleic acid analogues with conformationally locked furanose rings.



ChemBioChem
DOI: 10.1002/cbic.201200669

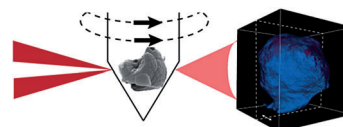


Zeolites

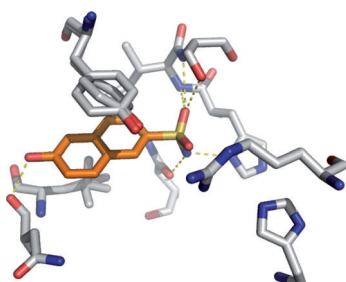
L. R. Aramburo, Y. Liu, T. Tylliszczak, F. M. F. de Groot, J. C. Andrews, B. M. Weckhuysen*

3D Nanoscale Chemical Imaging of the Distribution of Aluminum Coordination Environments in Zeolites with Soft X-Ray Microscopy

Which side are you on? Scanning transmission X-ray microscopy is used for the first time to elucidate the coordination and distribution of aluminum in industrial-relevant zeolites at the single-particle level. Extended regions of a few hundred nanometers, rich in higher aluminum coordination environments, are heterogeneously embedded within the zeolite particle, before and after a steaming post-treatment.



ChemPhysChem
DOI: 10.1002/cphc.201201015



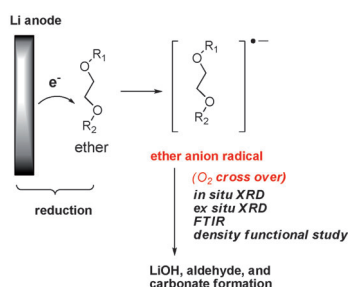
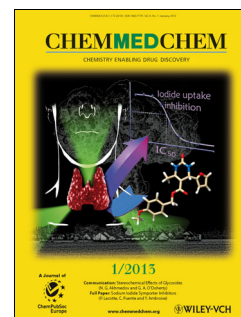
ChemMedChem
DOI: 10.1002/cmdc.201200508

Drug Design

M. F. Schmidt, O. Korb, N. I. Howard, M. V. B. Dias, T. L. Blundell, C. Abell*

Discovery of Schaeffer's Acid Analogues as Lead Structures of *Mycobacterium tuberculosis* Type II Dehydroquinase Using a Rational Drug Design Approach

Rational ligand design: Schaeffer's acid analogues were identified as novel inhibitors of *M. tuberculosis* type II dehydroquinase, a key enzyme of the shikimate pathway. Their likely binding mode was predicted using a combination of ensemble docking and flexible active site residues. Potentially, this scaffold could provide a good starting point for the design of antitubercular agents.



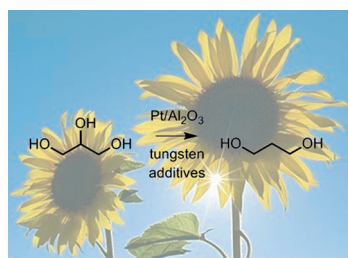
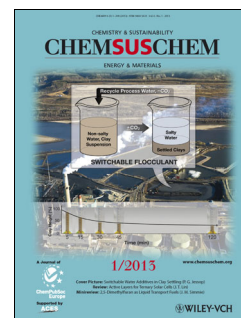
ChemSusChem
DOI: 10.1002/cssc.201200810

Lithium–Air Batteries

R. S. Assary, J. Lu, P. Du, X. Luo, X. Zhang, Y. Ren, L. A. Curtiss,* K. Amine*

The Effect of Oxygen Crossover on the Anode of a Li–O₂ Battery using an Ether-Based Solvent: Insights from Experimental and Computational Studies

Crosstown traffic: Further development of Li–O₂ batteries may eventually lead to their use in transportation applications. One problem that needs to be addressed is electrolyte decomposition, which has been partially mitigated by using ether- rather than carbonate-based solvents. The influence of oxygen crossover from the cathode to the anode on electrolyte, and lithium anode, decomposition in ether-based Li–O₂ batteries is investigated.



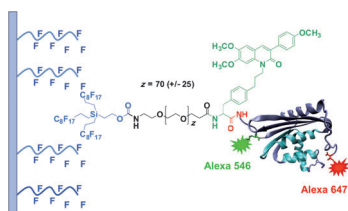
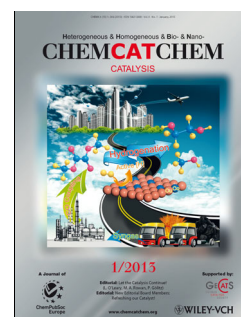
ChemCatChem
DOI: 10.1002/cctc.201200469

Conversion of Glycerol

J. ten Dam,* K. Djanashvili, F. Kapteijn, U. Hanefeld

Pt/Al₂O₃ Catalyzed 1,3-Propanediol Formation from Glycerol using Tungsten Additives

Tungsten is key: Four commercial catalysts (containing Pt or Pd) and four acidic additives (hydrochloric, tungstic, phosphotungstic, and silicotungstic acids) were used for the conversion of glycerol to propanediols in aqueous solution. The tungsten containing additives are the key to 1,3-propanediol selectivity.



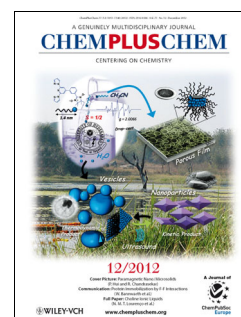
ChemPlusChem
DOI: 10.1002/cplu.201200234

Protein Immobilization

H. M. Rapp, S. Bacher, A. Ahrens, W. Rapp, B. Kammerer, G. U. Nienhaus, W. Bannwarth*

Attachment of Proteins to Surfaces by Fluorous–Fluorous Interactions Restoring Their Structure and Activity

Above the fold: An innovative strategy using a multifunctional linker system for the specific noncovalent immobilization of proteins to glass surfaces through fluorine–fluorine interactions without causing significant denaturation has been achieved. The principle was demonstrated for the enzymes RNase H and recombinant horseradish peroxidase (see figure).



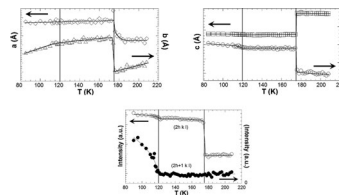


Symmetry Breaking in SC Complex

H. Watanabe, N. Bréfuel, E. Collet, L. Toupet, K. Tanaka, J.-P. Tuchagues*

Competing Symmetry Breaking and Spin Crossover in $[\text{FeH}_2\text{L}^{2-\text{Me}}](\text{ClO}_4)_2$

A symmetry breaking occurs at about 120 K in the low-spin (LS) phase of $[\text{FeH}_2\text{L}^{2-\text{Me}}](\text{ClO}_4)_2$. The thermally activated (ta) LS phase is of low symmetry (ls), while the photoinduced (PI) state is of high symmetry (hs). Relaxation from PIHS to LSIs occurs via an intermediate LSshs phase. LSIs and LSshs are metastable phases, and their competition depends on temperature and on the history of the material.



Eur. J. Inorg. Chem.
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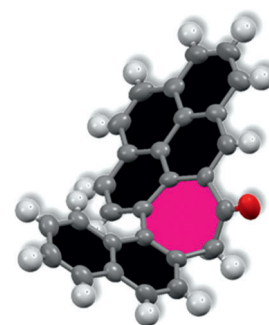


Binaphthyl-Based Cycloheptanones

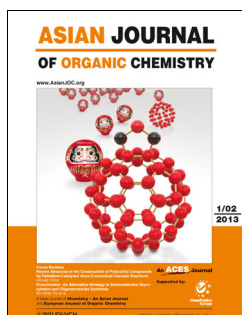
G. Pieters, K. Sbargoud, A. Bridoux, A. Gaucher*, S. Marque, F. Bourdreux, J. Marrot, D. Flot, G. Wantz, O. Dautel, D. Prim*

Benzannulated Cycloheptanones from Binaphthyl Platforms

Preparations of benzannulated cycloheptanones starting from binaphthyl molecular platforms are described.



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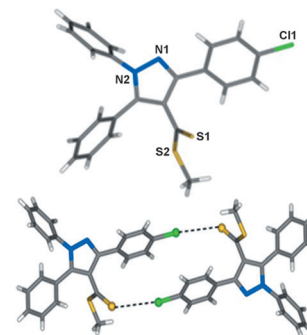


Pyrazoles

A. T. Khan,* A. Ghosh, S. Basha R, M. H. Mir

Synthesis of Trisubstituted 1H-Pyrazole-4-carbodithioates in a One-Pot Three-Component Reaction Catalyzed by Ferric Sulfate

An efficient synthesis of substituted-1H-pyrazole-4-carbodithioates is accomplished through the one-pot reaction of phenyl hydrazine, aldehydes, and alkyl-3-oxo-3-arylpropanedithioates by using ferric sulfate ($\text{Fe}_2(\text{SO}_4)_3 \cdot x\text{H}_2\text{O}$) at 80 °C. Mild reaction conditions, good yields, and shorter reaction times are some of the salient features of the present protocol. One of the products has a Cl...S interaction in its crystal structure.



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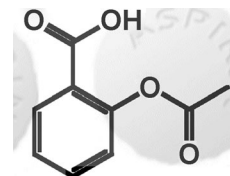


Medicinal Chemistry

Helena Dodziuk

Exciting Aspirin

Aspirin is the most widely used medicine in the world. Originating in the laboratories of Bayer AG, Aspirin is one of the very few drugs of the 19th century still used today. Professor Dodziuk, Warsaw, looks at the history and synthesis of this molecule and discusses how Aspirin is experiencing a second youth thanks to its applications in cancer treatment and stroke prevention.



ChemViews magazine
DOI: 10.1002/chemv.201300001