



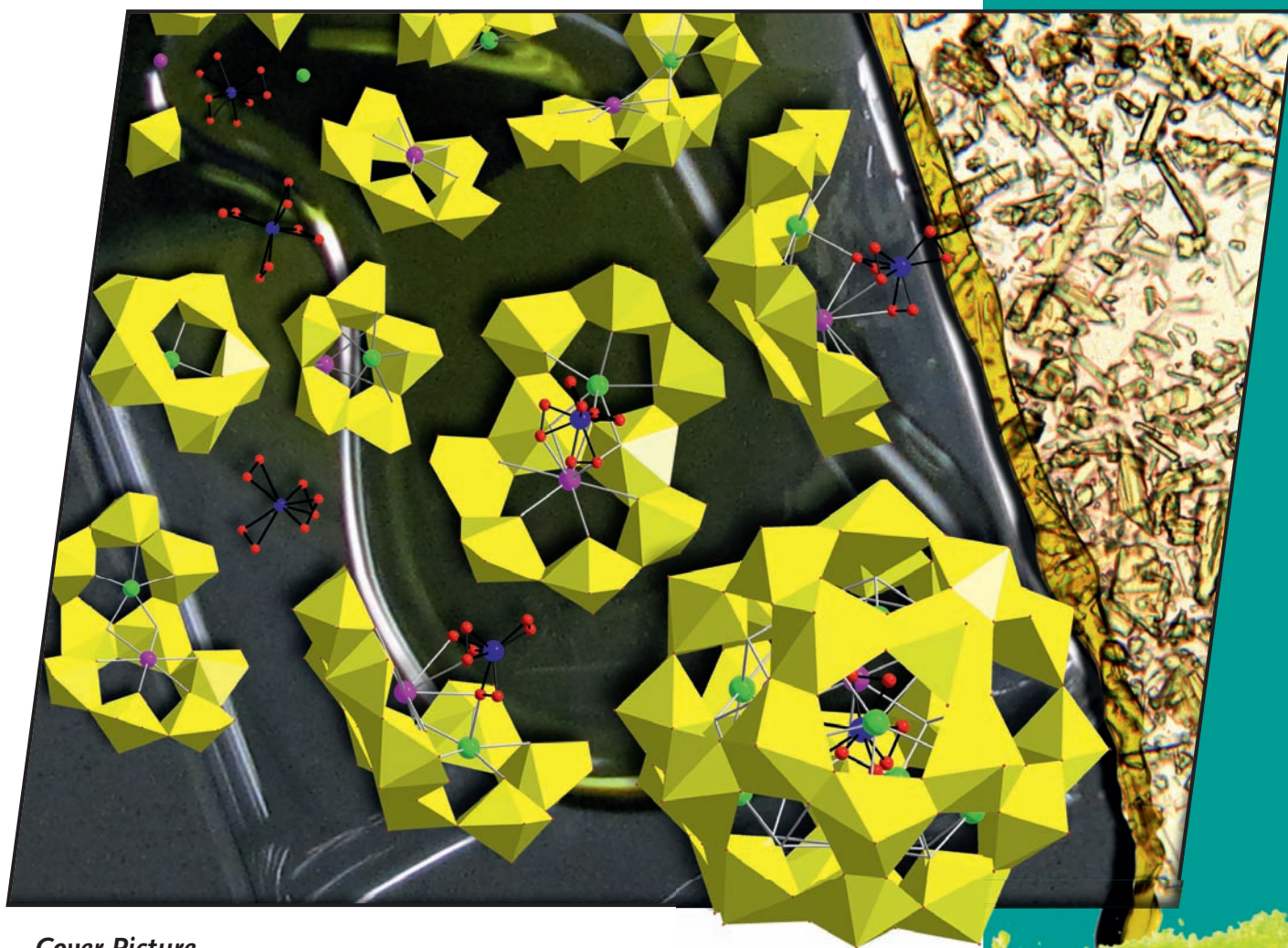
EurJIC

European Journal of
Inorganic Chemistry

14/2011
2nd May Issue



IYC 2011
International Year of
CHEMISTRY



Cover Picture

May Nyman et al.
The U₂₈ Nanosphere: What's Inside?

 **WILEY-VCH**

www.eurjic.org

EJICFK (14) 2183–2334 (2011) · ISSN 1434-1948 · No. 14/2011

A Journal of



**ChemPubSoc
Europe**

CONTENTS

FULL PAPERS

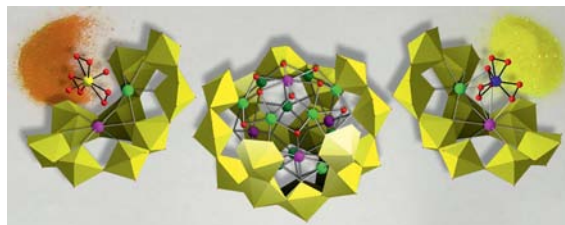
Uranium Cluster

M. Nyman,* M. A. Rodriguez,
T. M. Alam 2197–2205



The U_{28} Nanosphere: What's Inside?

Keywords: Cluster compounds / Peroxides / Polyanions / Polyoxometalates / Uranium



Reproducible, high-yield syntheses of uranyl peroxide polyoxometalates have been developed by strategic choice of internal templating cations and anions.

We demonstrate irrefutably these clusters can be redissolved intact: a key point to fully developing the chemistry of actinide polyoxometalates.

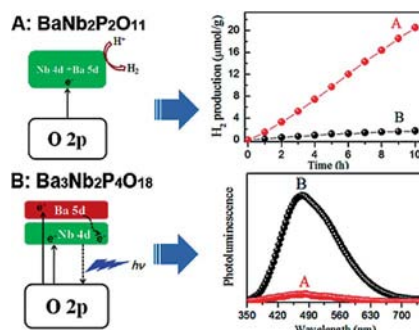
Ba–Nb– Phosphate Compounds

I. S. Cho, D. W. Kim, D. H. Kim,
S. S. Shin, T. H. Noh, D. W. Kim,*
K. S. Hong* 2206–2210



Electronic Band Structure, Optical Properties, and Photocatalytic Hydrogen Production of Barium Niobium Phosphate Compounds ($BaO-Nb_2O_5-P_2O_5$)

Keywords: Solid-phase synthesis / Ceramics / Electronic structure / Luminescence / Water splitting



Two barium niobium phosphate compounds ($BaNb_2P_2O_{11}$ and $Ba_3Nb_2P_4O_{18}$) were prepared by a conventional solid-state reaction method. Although both compounds have similar optical band gaps (ca. 3.6 eV), their optical and photocatalytic behavior differs due to their different conduction band constructions, which results from their different crystal structure environments.

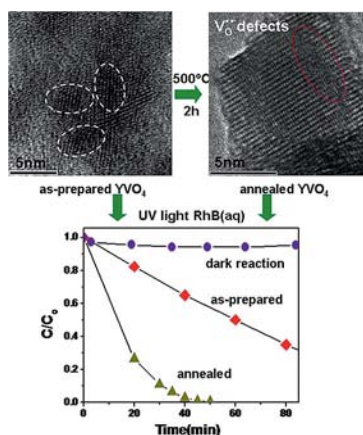
Yttrium-Vanadate Nanocrystals

L. Yang, G. Li, W. Hu, M. Zhao, L. Sun,
J. Zheng, T. Yan, L. Li* 2211–2220



Control Over the Crystallinity and Defect Chemistry of YVO_4 Nanocrystals for Optimum Photocatalytic Property

Keywords: Vanadium / Yttrium / Nanoparticles / Crystal engineering / Photocatalysis



YVO_4 nanocrystals with controlled crystallinity and surface chemical states were successfully prepared. It is demonstrated that YVO_4 nanocrystals with high crystallinity and sufficient oxygen vacancies show optimum photocatalytic performance.

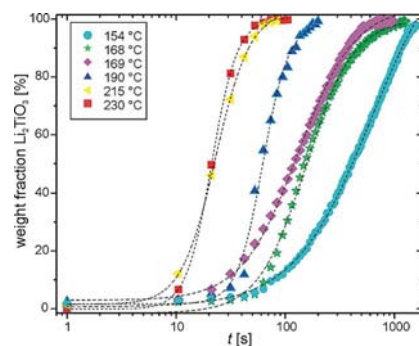
In-situ Synchrotron Diffraction

A. Laumann, K. M. Ørnsbjerg Jensen,
C. Tyrsted, M. Bremholm, K. T. Fehr,
M. Holzapfel, B. B. Iversen* ... 2221–2226

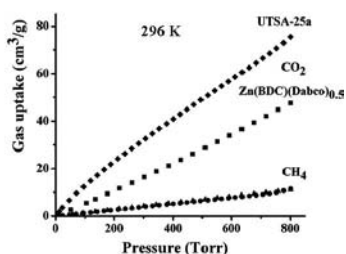
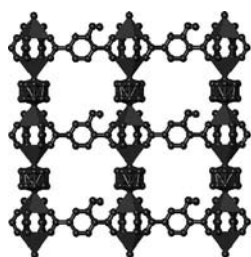


In-situ Synchrotron X-ray Diffraction Study of the Formation of Cubic Li_2TiO_3 Under Hydrothermal Conditions

Keywords: Kinetics / Reaction mechanisms / Hydrothermal synthesis / Titanium / Lithium / Synchrotron diffraction



Hydrothermal syntheses, following the reaction $TiO_2(s) + 2 LiOH(aq) \rightarrow Li_2TiO_3(s) + H_2O(l)$, are studied in-situ by synchrotron powder X-ray diffraction at varying temperatures. The formation of cubic Li_2TiO_3 shows increasing reaction rates at higher temperatures, which enables the determination of the activation energy.



The 3D microporous metal–organic framework (MOF) Zn(BDC-OH)(DABCO)_{0.5} (UTSA-25a; H₂BDC-OH = 2-hydroxybenzenedicarboxylic acid, DABCO = 1,4-diazabicyclo[2.2.2]octane) with func-

tional –OH groups on the pore surfaces exhibits much higher selective CO₂/CH₄ separation than the original MOF Zn(BDC)(DABCO)_{0.5} at ambient temperatures.

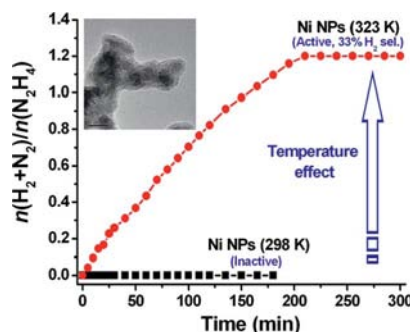
Z. Chen, S. Xiang, H. D. Arman, P. Li, D. Zhao,* B. Chen* 2227–2231

Significantly Enhanced CO₂/CH₄ Separation Selectivity within a 3D Prototype Metal–Organic Framework Functionalized with OH Groups on Pore Surfaces at Room Temperature

Keywords: Zinc / Microporous materials / Adsorption / Immobilization / Gas separation / Carbon dioxide

Hydrogen Generation

A drastic enhancement in the catalytic performance of Ni nanoparticles, which are inactive for the decomposition of hydrous hydrazine to hydrogen at room temperature, was observed with an increase of reaction temperature to 323 K. This temperature effect has been exploited to achieve 100% H₂ selectivity from hydrous hydrazine decomposition by alloying Ni and Pt with a Pt content as low as 1 mol-%.

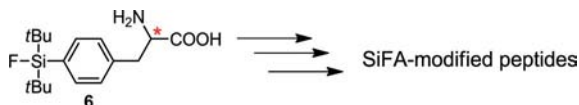


S. K. Singh, Z.-H. Lu, Q. Xu* 2232–2237

Temperature-Induced Enhancement of Catalytic Performance in Selective Hydrogen Generation from Hydrous Hydrazine with Ni-Based Nanocatalysts for Chemical Hydrogen Storage

Keywords: Nickel / Hydrogen / Hydrazine / Nanostructures / Temperature effects

¹⁸F-Labelled Peptides



Both enantiomers of the SiFA-modified phenylalanine were synthesized and characterized. They are key compounds for the efficient synthesis of a large variety of

SiFA-modified peptides, which, in turn, hold great potential for the development of novel ¹⁸F-labelled radiopharmaceuticals.

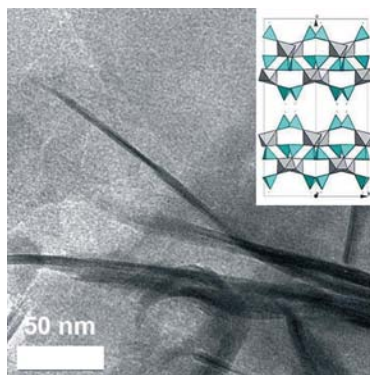
L. Iovkova, D. Könnig, B. Wängler,* R. Schirmacher, S. Schoof, H.-D. Arndt, K. Jurkschat* 2238–2246

SiFA-Modified Phenylalanine: A Key Compound for the Efficient Synthesis of ¹⁸F-Labelled Peptides

Keywords: Fluorine / Silicon / Radiopharmaceuticals / Synthesis design / Enantioselectivity / Amino acids

Intercalations

The synthesis of lamellar microporous titanasilicate AM-4 has been improved by varying the Ti source, autoclave time, and seeding. UZAR-S2 has been obtained by swelling and exfoliation of small crystals of AM-4.



C. Casado, D. Ambroj, Á. Mayoral, E. Vispe, C. Téllez, J. Coronas* 2247–2253

Synthesis, Swelling, and Exfoliation of Microporous Lamellar Titanasilicate AM-4

Keywords: Intercalations / Layered compounds / Adsorption / Organic–inorganic hybrid composites / Zeolite analogues

CONTENTS

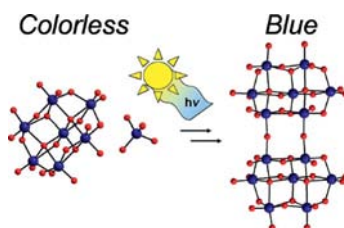
Photoreduction

A. Wutkowski, B. R. Srinivasan,*
A. R. Naik, C. Schütt, C. Näther,
W. Bensch* 2254–2263



Synthesis, Structure, and Photochemistry of an Organic Heptamolybdate-Monomolybdate

Keywords: Photochemistry / Polyoxometalates / Molybdenum / Reduction

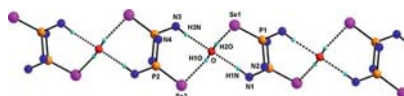


Colorless $(\text{BuNH}_3)_8[(\text{Mo}_7\text{O}_{24})(\text{MoO}_4)] \cdot 3\text{H}_2\text{O}$ (BuNH_3 = butan-1-aminium), which contains heptamolybdate and monomolybdate anions, is easily transformed to the blue dimer $(\text{BuNH}_3)_{10}[(\text{Mo}_7\text{O}_{22})(\mu_2\text{-O})_2(\text{Mo}_7\text{O}_{22})] \cdot 5.5\text{H}_2\text{O}$ under sun irradiation.

Selenium Hydrogen Bonding

P. Chandrasekaran, J. T. Mague,
M. S. Balakrishna* 2264–2272

Synthesis and Derivatization of the Bis(amido)- λ^3 -cyclodiphosphazanes $\text{cis-}[\text{R}'(\text{H})\text{NP}(\mu\text{-NR})_2]_2$, Including a Rare Example, $\text{trans-}[\text{tBu}(\text{H})\text{N}(\text{Se})\text{P}(\mu\text{-NCy})_2]_2$, Showing Intermolecular $\text{Se} \cdots \text{H}-\text{O}$ Hydrogen Bonding



Bis(amido)- λ^3 -cyclodiphosphazanes, $\text{cis-}[\text{R}'(\text{H})\text{NP}(\mu\text{-NR})_2]_2$, were prepared and converted into their P^{V} derivatives of the type $\text{cis-}[\text{R}'(\text{H})\text{N}(\text{E})\text{P}(\mu\text{-NR})_2]_2$ [$\text{E} = \text{O}, \text{S}, \text{Se}, \text{N} = \text{P}(\text{O})(\text{OPh})_2$]. An intermolecular $\text{Se} \cdots \text{H}-\text{O}$ hydrogen bond between $\text{trans-}[\text{tBu}(\text{H})\text{N}(\text{Se})\text{P}(\mu\text{-NCy})_2]_2$ and H_2O was observed.

Keywords: Chalcogens / Selenium / Phosphorus / Heterocycles / Hydrogen bonds

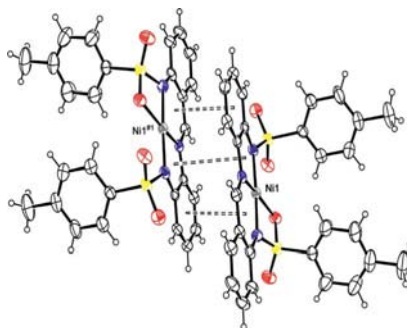
Schiff Base Complexes

A. Sousa-Pedrares, J. A. Viqueira, J. Antelo, E. Labisbal, J. Romero, A. Sousa, O. R. Nascimento,
J. A. García-Vázquez* 2273–2287



Synthesis and Characterization of Homo- and Heteroleptic Cobalt, Nickel, Copper, Zinc and Cadmium Compounds with the 2-(Tosylamino)- N -[2-(tosylamino)benzylidene]aniline Ligand

Keywords: Copper / Cobalt / Nickel / Zinc / Cadmium / Transition metals / Schiff bases / Structure elucidation / Hydrogen bonds / Stacking interactions / Electrochemistry



Homo- and heteroleptic metal(II) complexes (Co, Ni, Cu, Zn and Cd) containing the 2-(tosylamino)- N -[2-(tosylamino)benzylidene]aniline ligand have been synthesized by an electrochemical procedure and characterized by various spectroscopic techniques and single-crystal X-ray diffraction.

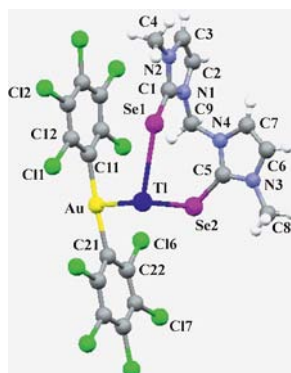
Organodiselenone Ligands

M. Arca, T. Aroz, M. Concepción Gimeno, M. Kulcsar, A. Laguna, T. Lasanta, V. Lippolis,* J. M. López-de-Luzuriaga,*
M. Monge, M. E. Olmos 2288–2297



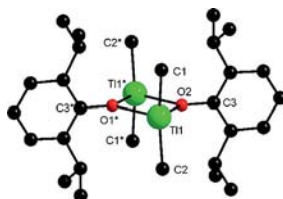
Homopolynuclear Tl^{I} and Heteropolynuclear $\text{Au}^{\text{I}}-\text{Tl}^{\text{I}}$ Complexes with Organodiselenone Ligands: Activation of Luminescence by Intermetallic Interactions

Keywords: Gold / Thallium / Selenium ligands / Luminescence / Density functional calculations



Homopolynuclear Tl^{I} and heteropolynuclear $\text{Au}^{\text{I}}-\text{Tl}^{\text{I}}$ complexes that bear organodiselenone ligands have been synthesized. The luminescence of the $\text{Au}-\text{Tl}$ derivatives has been analyzed experimentally and theoretically through DFT calculations.

X-ray structural analysis of dimeric $[\text{Me}_2\text{TlO}(2,6\text{-R}_2\text{C}_6\text{H}_3)_2]_2$ ($\text{R} = \text{H}, \text{Me}, i\text{Pr}, \text{Ph}$) shows significant structural changes due to the increased steric bulk of the phenoxide ligand. Sufficient steric bulk is present when $\text{R} = t\text{Bu}$ to facilitate isolation of a monomeric species. DFT calculations were employed to rationalize the observed structures.



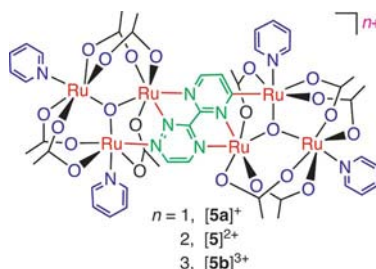
**G. G. Briand,* A. Decken, J. I. McKelvey,
Y. Zhou 2298–2305**

Structural Effects of Varied Steric Bulk in 2,4,6-Substituted Dimethylthallium(III) Phenoxides

Keywords: Thallium / O ligands / Density functional calculations / Structure elucidation

Mixed-Valence Chemistry

Dimeric species of triruthenium cluster moieties exhibit six reversible one-electron redox processes and rich mixed-valence chemistry with strong cluster–cluster interactions across the asymmetric bis(tridentate) triazine ligand.



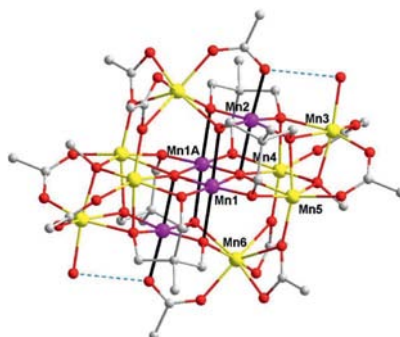
**F.-R. Dai, Y.-H. Wu,
L.-Y. Zhang, B. Li, L.-X. Shi,
Z.-N. Chen* 2306–2316**

Spectroscopic, Electrochemical, and DFT Studies of Oxo-Centered Triruthenium Cluster Complexes with a Bis(tridentate) Triazine Ligand

Keywords: Ruthenium / Cluster compounds / N ligands / Redox chemistry / Density functional calculations

Modifiable Magnetic Anisotropy

A series of valence-sandwich-type $\text{Mn}^{\text{III}}_4\text{Mn}^{\text{II}}_8$ clusters were synthesized by solvothermal reaction. Magnetization studies reveal that they all behave as single-molecule magnets (SMMs) and the ground-state anisotropy of four clusters are effectively modified by intra- and intermolecular interactions by substituting tripodal ligands and terminal ligands.



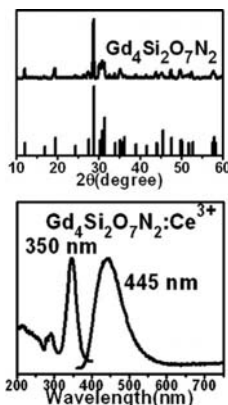
**J.-D. Leng, L.-Y. Dian, J.-L. Liu,
M.-L. Tong* 2317–2326**

A Series of $\text{Mn}^{\text{III}}_4\text{Mn}^{\text{II}}_8$ Single-Molecule Magnets Mediated by Intra- and Intermolecular Interactions

Keywords: Manganese / Tripodal ligands / Molecular interactions / Magnetic properties / Single-molecule magnets

Tunable Phosphors

New interesting luminescent $\text{Gd}_4\text{Si}_2\text{O}_7\text{N}_2$ materials doped with Ce^{3+} , Tb^{3+} or Dy^{3+} have been prepared and their luminescence properties have been studied. Under UV excitation, $\text{Gd}_4\text{Si}_2\text{O}_7\text{N}_2\text{:Ce}^{3+}$ shows blue emission. The emission colour of $\text{Gd}_4\text{Si}_2\text{O}_7\text{N}_2\text{:Tb}^{3+}$ and $\text{Gd}_4\text{Si}_2\text{O}_7\text{N}_2\text{:Dy}^{3+}$ can be tuned.



Y. Song, N. Guo, H. You* 2327–2332

Synthesis and Luminescent Properties of Cerium-, Terbium-, or Dysprosium-Doped $\text{Gd}_4\text{Si}_2\text{O}_7\text{N}_2$ Materials

Keywords: Cerium / Terbium / Dysprosium / Luminescence

* Author to whom correspondence should be addressed.

Supporting information on the WWW (see article for access details).

This article is available online free of charge (Open Access).