

# 无机化学学报

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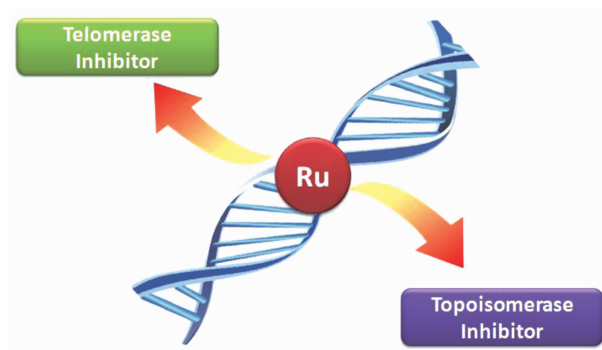


Special Issue Dedicated to Prof. Shen Pan-Wen for his 100th Birthday and 75 Years Service on Education/Research

### Reviews

#### New Trends of Ruthenium Complexes as Inhibitors Targeting Topoisomerase and Telomerase

CHEN Xiang, CHAO Hui, JI Liang-Nian



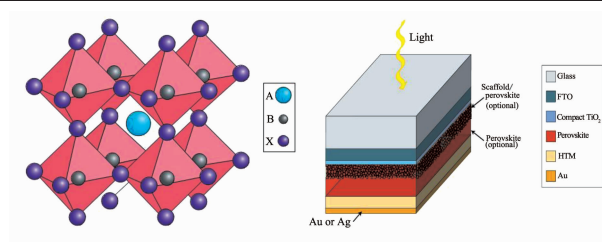
In the series of non-platinum drugs, ruthenium complexes are regarded as one of the most potential anti-tumor drugs. This review focuses on the topoisomerase and telomerase inhibited by interactions between ruthenium complexes and DNA, introducing the advance anti-tumor applications of ruthenium complexes in new perspectives.

DOI:10.11862/CJIC.2015.241

*Chinese J. Inorg. Chem.*, **2015**,**31**:1667-1677

#### Modulation of the Structure and Property of $ABX_3$ Type Perovskite Photovoltaic Material

LU Xin-Rong, ZHAO Ying, LIU Jian,  
LI Cheng-Hui, YOU Xiao-Zeng



Perovskite type inorganic-organic hybrid  $ABX_3$  materials have received widespread concerns for their application in solar cell fabrication. The properties of  $ABX_3$  will directly affect the performance of perovskite solar cell. In this paper, we review on the present methods to tune the structure and properties of perovskite type  $ABX_3$  material.

DOI:10.11862/CJIC.2015.257

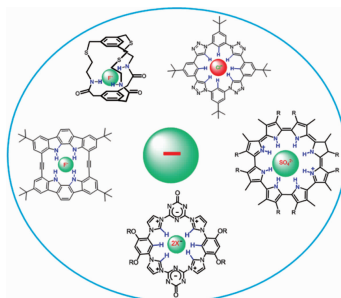
*Chinese J. Inorg. Chem.*, **2015**,**31**:1678-1686

## Recent Development of Anion Receptors Based on Hydrogen Bonding

LI Yong-Jun, LIU Hui-Biao, LI Yu-Liang

DOI:10.11862/CJIC.2015.252

*Chinese J. Inorg. Chem.*, **2015**,**31**:1687-1704



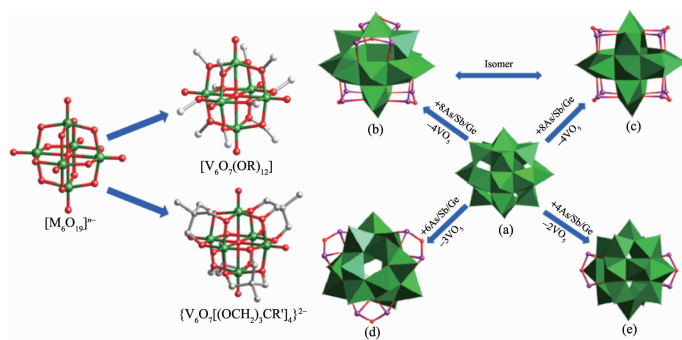
The recent progress of anion receptors based on different hydrogen bonding units, such as amide, urea/ thiourea, indole/pyrroles, triazole, ammonium, guanidinium, imidazole, hydroxyl groups, have been reviewed.

## Progress in Polyoxovanadate Chemistry

LI Ji-Kun, HU Chang-Wen

DOI:10.11862/CJIC.2015.247

*Chinese J. Inorg. Chem.*, **2015**,**31**:1705-1725



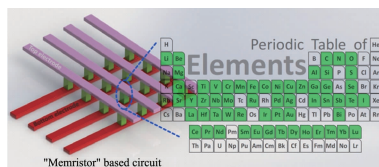
This review summarizes the recent research progress of polyoxovanadates (POVs) chemistry. The synthesis, structures and properties of organic-functionalized POVs have been discussed in detail and the related advancements of heteropolyoxovanadates have also been overviewed. The researching prospects of POVs have been given in the last part of the paper.

## Memristive Effects in Inorganic Solid Materials

WU Xiao-Feng, YUAN Long, HUANG Ke-Ke, FENG Shou-Hua

DOI:10.11862/CJIC.2015.254

*Chinese J. Inorg. Chem.*, **2015**,**31**:1726-1738



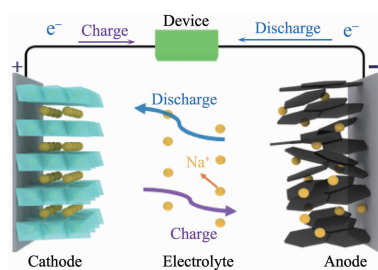
Memristive effects are typically based on two-terminal metal/insulator/metal configuration and have been extensively studied for the future applications such as non-volatile storage, analogue circuit and neuromorphic computing. In this review, the main mechanism, material types and recent progress of memristive effect in inorganic solid state materials are summarized in detail.

## Research on Electrode Materials for Sodium-Ion Batteries

ZHANG Ning, LIU Yong-Chang, CHEN Cheng-Cheng, TAO Zhan-Liang, CHEN Jun

DOI:10.11862/CJIC.2015.258

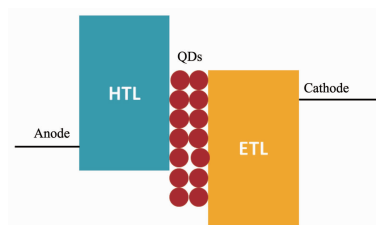
*Chinese J. Inorg. Chem.*, **2015**,**31**:1739-1750



Sodium-ion batteries (SIBs) have recently attracted an increasing interest for large-scale energy storage applications because of the huge availability of sodium source. We here review the updated research of selected electrode materials of SIBs. This should shed light on the R & D of advanced electrode materials for SIBs.

## Research Progress on High-efficiency and Stable II-IV Group Quantum-Dot Light-Emitting Diodes

LIU Yang, LIU Zhi-Wei, BIAN Zu-Qiang, HUANG Chun-Hui



Light-emitting diodes based on quantum dots (QD-LEDs) have great potential for solid-state lighting and display applications. In a typical QD-LEDs, QDs are sandwiched between functional layers such as hole transport layer (HTL) and electron transport layer (ETL). So the challenges of a high-efficiency and stable QD-LEDs are focused on properties of QDs and functional layers. Recent research progresses on QD-LEDs, including optimization of the structure of electrically excited QDs, as well as selection of functional layers are summarized. So far, the application of QD-LEDs is still a challenge.

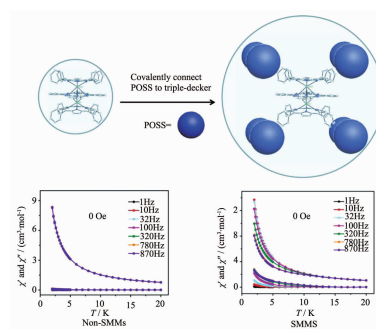
DOI:10.11862/CJIC.2015.255

*Chinese J. Inorg. Chem.*, **2015**,**31**:1751-1760

## Articles

### Mixed Tetrapyrrole Terbium Triple-Decker Single Molecule Magnets with Bulky Inorganic Polyhedral Oligomeric Silsesquioxanes Moieties at Outer Porphyrin Peripheries (English)

ZHANG Lu, ZENG Su-Yuan, LIU Tao, SUN Jun-Shan, DOU Jian-Min, JIANG Jian-Zhuang

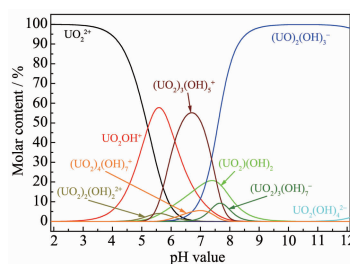


DOI:10.11862/CJIC.2015.190

*Chinese J. Inorg. Chem.*, **2015**,**31**:1761-1773

### Effect of Low-Enriched Uranium Targets Irradiation on Major Fission Elements and Uranium Speciation

LAN Tu, LIU Zhan-Xiang, LI Xing-Liang, LIAO Jia-Li, LUO Shun-Zhong, YANG Yuan-You, CHAI Zhi-Fang, LIU Ning, WANG Dong-Qi



The concentration of uranyl and the pH value of solution influence significantly the speciation of uranyl in water, and polynuclear complexes may be generated at high concentration of uranyl.

DOI:10.11862/CJIC.2015.245

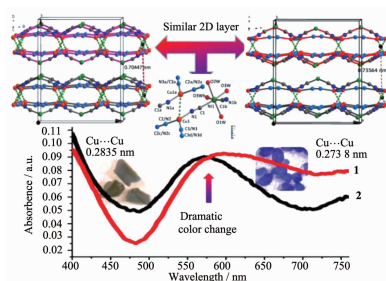
*Chinese J. Inorg. Chem.*, **2015**,**31**:1774-1784

Distinguishable Polymorphs in Color:  
Cyano-Bridged Heterometallic  
Pentagonal Ribbons via Cuprophilic  
Aggregation (English)

QIN Ying-Lian, LI Shi-Li, JIANG Ning,  
ZHANG Xian-Ming

DOI:10.11862/CJIC.2015.249

*Chinese J. Inorg. Chem.*, **2015**,**31**:1785-1797



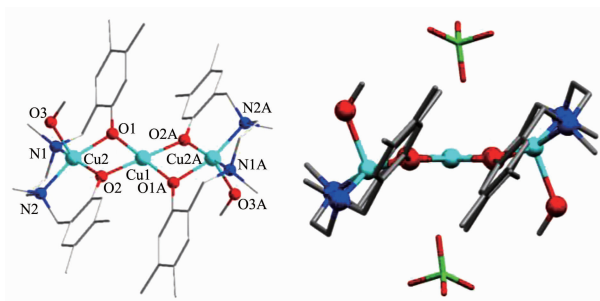
By hydrothermal treatment of environmentally friendly  $[\text{Ni}(\text{CN})_4]^{2-}$  and  $\text{CuCl}_2$ , two heterometallic supramolecular polymorphs constructed by pentagonal ribbons via cuprophilic interactions were synthesized. Interestingly, the two structurally almost indistinguishable compounds show significant cuprophilicity associated dramatic color difference in solid state.

Synthesis, Structure and Magnetic  
Properties of Phenoxo-Bridged  
Polynuclear Cu(II) Complexes

XIE Qi-Wei, CUI Ai-Li, KOU Hui-Zhong

DOI:10.11862/CJIC.2015.219

*Chinese J. Inorg. Chem.*, **2015**,**31**:1798-1804



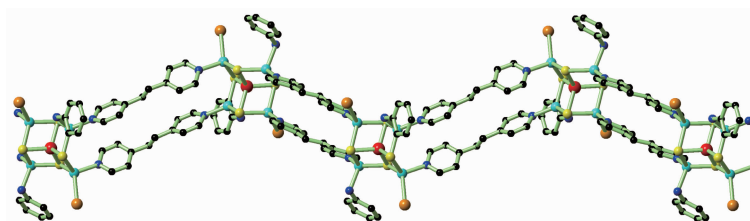
Two copper complexes based on a flexible  $\text{N}_2\text{O}_2$  chelate ligand have a linear phenoxo-bridged  $\text{Cu}^{\text{II}}_3$  core structure. The adjacent  $\text{Cu}(\text{II})$  ions are antiferromagnetically coupled.

Two One-Dimensional  $[\text{MS}_4\text{Cu}_4]$ -  
Supported Coordination Polymers:  
Assembly and Crystal Structures of  
 $\{[\text{MS}_4\text{Cu}_4(\text{bpe})_2(\text{ani})_2\text{I}_2] \cdot 3.5\text{ani}\}_n$  ( $\text{M}=\text{Mo},$   
 $\text{W}$ ; ani=aniline) (English)

LIU Quan, CHEN Qiu-Fang, YU Hong,  
ZHAO Xin, ZHANG Wen-Hua,  
LANG Jian-Ping

DOI:10.11862/CJIC.2015.237

*Chinese J. Inorg. Chem.*, **2015**,**31**:1805-1810



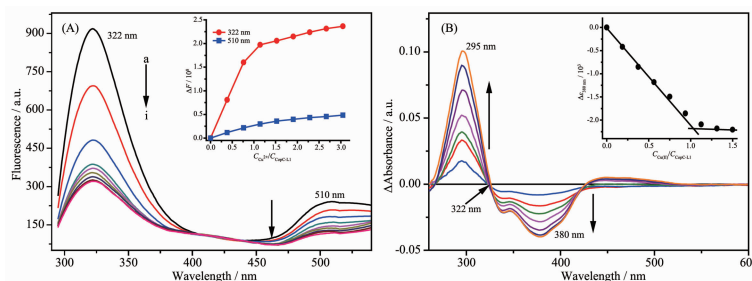
Reactions of the cluster precursors  $[\text{Et}_4\text{N}]_4[\text{MS}_4\text{Cu}_4\text{I}_6]$  ( $\text{M}=\text{Mo}, \text{W}$ ) with 1,2-bis(4-pyridyl)ethane (bpe) in aniline afforded two analogous 1D coordination polymers  $\{[\text{MS}_4\text{Cu}_4(\text{bpe})_2(\text{ani})_2\text{I}_2] \cdot 3.5\text{ani}\}_n$  (ani=aniline). The  $[\text{MS}_4\text{Cu}_4]$  cores in the latter compounds are connected by double bpe bridges to afford a zigzag-type chain extending along the [111] direction.

Spectral Studies on Complex of  
2,6-Pyridine Diformylhydrazine  
2-Hydroxynaphthene Carboxylic  
Hydrazone-Cu(II)-CopC

REN Xiao-Lin, SONG Zhen, YANG Bin-Sheng

DOI:10.11862/CJIC.2015.244

*Chinese J. Inorg. Chem.*, **2015**,**31**:1811-1819



2, 6-Pyridine diformylhydrazine 2-hydroxynaphthene carboxylic hydrazone (L1) can bind to CopC in N-terminal. Since a ternary complex, L1-Cu(II)-CopC is formed the copper trafficking ability of CopC will be changed.

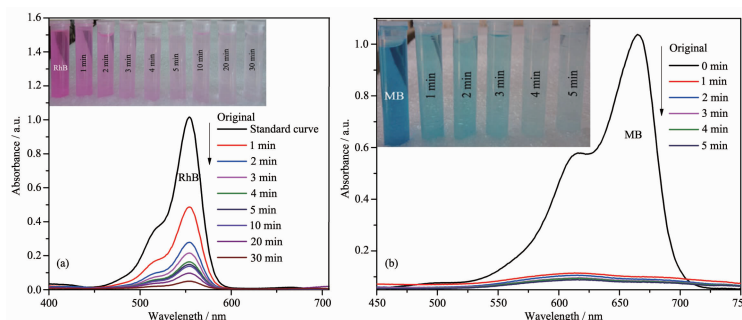


## Four Keggin-Based Nanomaterials: Synthesis and Adsorption of Organic Dyes

NASEN Bate, CHEN Wei-Lin, LIU Zhu-Jun,  
XU Sha-Sha, WANG En-Bo

DOI:10.11862/CJIC.2015.246

*Chinese J. Inorg. Chem.*, **2015**,**31**:1820-1826



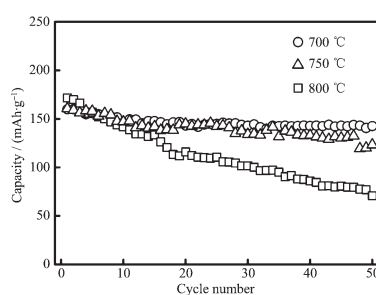
Four POM-based nanomaterials ( $\text{PMo}_{12}^b$ ,  $\text{PW}_{12}^b$ ,  $\text{SiW}_{12}^b$ ,  $\text{GeW}_{12}^b$ ) have been synthesized and present excellent adsorption properties of the organic dyes. The adsorption efficiency towards MB (100 mL of  $20 \text{ mg L}^{-1}$ ) could reach up to 96.3% in 5 min under dark condition, while it is up to 96.1% in 30 min towards RhB.

## Synthesis and Performance of $\text{LiNi}_{0.5}\text{Co}_{0.4}\text{Al}_{0.1}\text{O}_2$ Composite Material for Lithium Ion Batteries

ZHANG Yu, SU Zhi, PAN Hui

DOI:10.11862/CJIC.2015.250

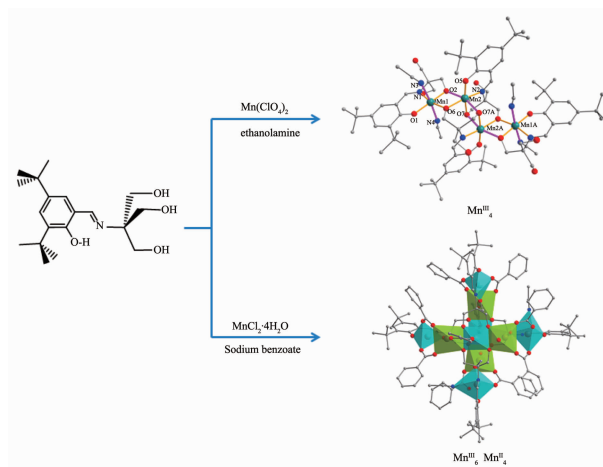
*Chinese J. Inorg. Chem.*, **2015**,**31**:1827-1830



The experiments demonstrate that the  $\text{LiNi}_{0.5}\text{Co}_{0.4}\text{Al}_{0.1}\text{O}_2$  is a very promising cathode material which shows good electrochemical properties and will be used in the future lithium ion batteries.

## Synthesis, Structures and Magnetic Properties of Two Tetranuclear and Decanuclear Manganese Clusters Bearing the Multidentate Schiff-Base Ligands

YANG Xiao-Xun, LENG Ji-Dong,  
LIU Jun-Liang, JIA Jian-Hua,  
TONG Ming-Liang



Solution reactions of two  $\text{Mn}^{\text{II}}$  salts with a Schiff-base ligand generated a tetranuclear  $\{\text{Mn}^{\text{III}}_4\}$  and a decanuclear  $\{\text{Mn}^{\text{III}}_6\text{Mn}^{\text{II}}_4\}$  complex, respectively. The  $\text{Mn}^{\text{III}}$  ions in both clusters were from the oxidation products of starting  $\text{Mn}^{\text{II}}$  ions. Antiferromagnetic interactions were found present in decanuclear species according to the dc magnetic susceptibility data.

DOI:10.11862/CJIC.2015.260

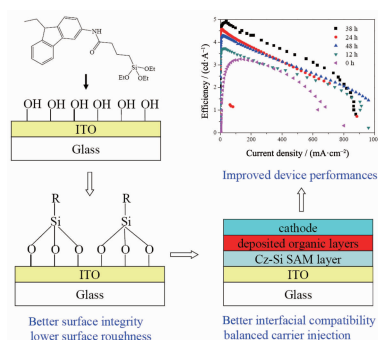
*Chinese J. Inorg. Chem.*, **2015**,**31**:1831-1838

# Indium Tin Oxide Anode Self-Assembled Monolayer Modification for Device Performance Improvement of Organic Light-Emitting Diodes (English)

DENG Rui-Ping, ZHOU Liang, LI Lei-Jiao, ZHANG Hong-Jie

DOI:10.11862/CJIC.2015.242

Chinese J. Inorg. Chem., **2015**,**31**:1839-1846



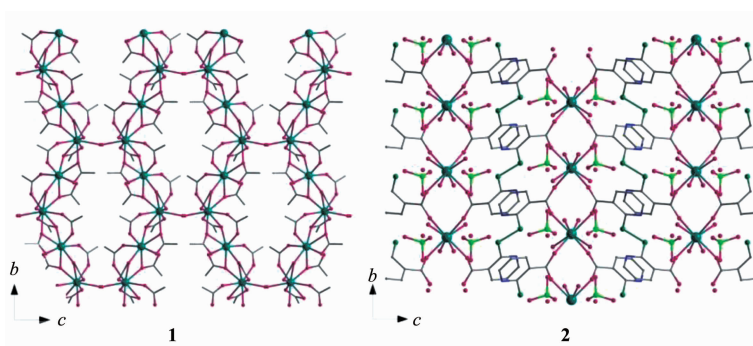
An organosilane Cz-Si was synthesized and used to modify the ITO surface in OLEDs. This SAM modification resulted in better interfacial compatibility, balanced carrier injection and significantly improved device performances.

# Magnetic Relaxation in 1D and 2D Dysprosium(III) Coordination Polymers (English)

WU Jian-Feng, ZHANG Hai-Xia, ZHANG Peng, ZHAO Lang, TANG Jin-Kui

DOI:10.11862/CJIC.2015.236

Chinese J. Inorg. Chem., **2015**,**31**:1847-1854



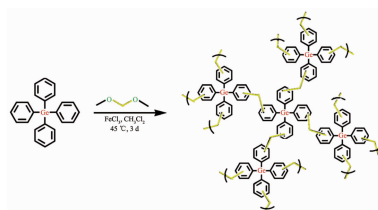
Carboxylato-bridged 1D dysprosium chain and 2D dysprosium network show slow magnetic relaxation behavior, offering a promising way to construct ordered molecule magnet complexes.

# Porous Aromatic Frameworks: Synthesis via Friedel-Crafts Alkylation Reaction and Gas Sorption Property (English)

CUI Peng, JING Xiao-Fei, REN Hao, YUAN Ye, ZHU Guang-Shan

DOI:10.11862/CJIC.2015.256

Chinese J. Inorg. Chem., **2015**,**31**:1855-1859



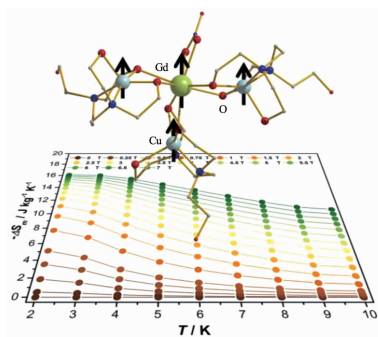
The title porous aromatic framework materials (PAF-9) possess high thermal and chemical stability as well as high BET surface area of 334 m<sup>2</sup> · g<sup>-1</sup> and exhibit high CO<sub>2</sub> adsorption ability.

# Cryogenic Magnetic Refrigeration Properties of Heterometallic {LnCu<sub>3</sub>} Cluster Family (English)

LI Han, SONG Fen, SHI Wei, MA Jian-Gong, CHENG Peng

DOI:10.11862/CJIC.2015.248

Chinese J. Inorg. Chem., **2015**,**31**:1860-1866



A family of {LnCu<sub>3</sub>} clusters were selected to study their magnetocaloric effect (MCE). The results suggest the importance of ferromagnetic interactions in designing of 3d-4f molecular coolers.

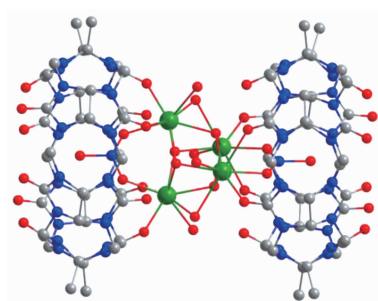


Slow Magnetic Relaxation in Sandwich-Type Tetranuclear Dysprosium Complex with TMeQ[6] (TMeQ[6]= $\alpha$ ,  $\alpha$ ,  $\delta$ ,  $\delta$ -Tetramethylcucurbit[6]uril)

CHEN Wen-Jian, KONG Xiang-Jian,  
LONG La-Sheng, ZHENG Lan-Sun

DOI:10.11862/CJIC.2015.226

*Chinese J. Inorg. Chem.*, **2015**,**31**:1867-1874



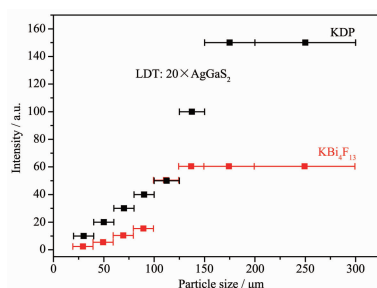
Two TMeQ [6]-supported sandwich tetranuclear lanthanide clusters were obtained. The Dy<sub>4</sub> displays slow magnetization relaxation, while Tb<sub>4</sub> exhibits intense photoluminescence.

KBi<sub>4</sub>F<sub>13</sub>: An Infrared Nonlinear Optical Material with High Laser Damage Threshold

WU Qi, LIU Hong-Ming, JINANG Fang-Chao,  
MENG Xiang-Gao, CHEN Xing-Guo,  
YANG Lei, HU Zhang-Gui, QIN Jin-Gui

DOI:10.11862/CJIC.2015.238

*Chinese J. Inorg. Chem.*, **2015**,**31**:1875-1880



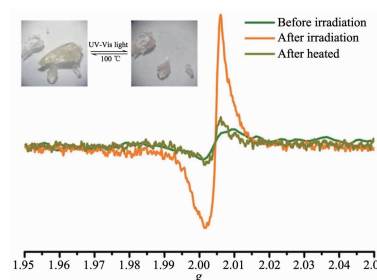
KBi<sub>4</sub>F<sub>13</sub> shows high laser damage threshold which is much higher than that of the currently commercialized IR NLO material AgGaS<sub>2</sub> while it exhibits proper second harmonic generation effect, mid-IR transparent window and thermal stability.

The First Photochromic Compound Containing 4,4'-Bipyridine and Zinc Acetate (English)

SU Yi-Bo, WANG Ming-Sheng,  
GUO Guo-Cong

DOI:10.11862/CJIC.2015.259

*Chinese J. Inorg. Chem.*, **2015**,**31**:1881-1884



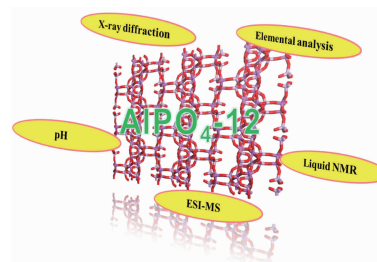
A photochromic compound built without traditional photochromic units has been found based on our previously proposed design strategy for electron-transfer photochromic materials. It is the first photochromic compound containing 4,4'-bipyridine and zinc acetate.

Crystallization Process of Open-Framework Aluminophosphate AlPO<sub>4</sub>-12

LU Hui-Ying, LIU Shu, XU Jun,  
YAN Wen-Fu, LIU Zhi-Qiang, DENG Feng,  
XU Ru-Ren

DOI:10.11862/CJIC.2015.251

*Chinese J. Inorg. Chem.*, **2015**,**31**:1885-1893



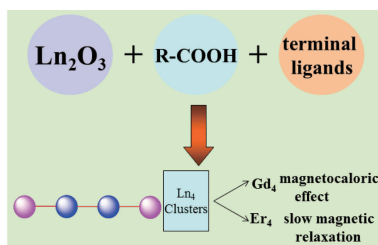
The crystallization process of AlPO<sub>4</sub>-12 was investigated using liquid NMR and electrospray ionization mass spectra (ESI-MS) and so on. The formation of 4- and 6-membered rings was confirmed by the ESI-MS data. These findings have important guiding significance for the directed synthesis of molecular sieves.

## Carboxylate-Bridged Tetranuclear Lanthanide Clusters: Magnetocaloric Effect and Slow Magnetic Relaxation (English)

LIU Sui-Jun, CUI Yu, SONG Wei-Chao,  
WANG Qing-Lun, BU Xian-He

DOI:10.11862/CJIC.2015.240

*Chinese J. Inorg. Chem.*, **2015**,**31**:1894-1902



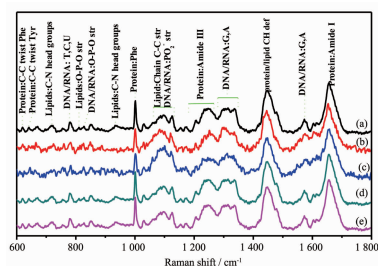
Three carboxylate-bridged Ln<sup>III</sup> clusters synthesized by hydrothermal method exhibit a linear tetranuclear structure and weak magnetic behaviors with significant magnetocaloric effect and slow magnetic relaxation.

## Comparative Interaction Mechanisms Between Cells and Gold Nanoparticles Modified with Different Chemical Functional Groups

WEN Chang-Chun, LEI Wen-Qi,  
SHEN Xing-Can, JI Shi-Chen,  
JIANG Bang-Ping, LIANG Hong

DOI:10.11862/CJIC.2015.253

*Chinese J. Inorg. Chem.*, **2015**,**31**:1903-1912



The backbone and nucleic bases of DNA as well as the polar headgroup of phospholipid in cells are the probable target binding sites of AuNPs and Au-CH<sub>3</sub> NPs. Whereas, the interfacial interactions are significantly reduced as cells treated with Au-COOH NPs and Au-OH NPs.

## Synthesis of $\beta$ -Cyclodextrin Functionalized Fluorescent Gold Nanoclusters for Cellular Imaging (English)

SUN Jing-Hua, ZHANG Wei, TAN Cai-Ping,  
JI Liang-Nian, MAO Zong-Wan

DOI:10.11862/CJIC.2015.239

*Chinese J. Inorg. Chem.*, **2015**,**31**:1913-1918

