

# 无机化学学报

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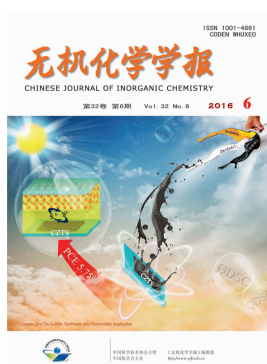
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### Cover



#### Copper Zinc Tin Sulfide: Synthesis and Photovoltaic Application

WANG Cong, ZHAO Qing-Fei, ZHANG Hua

DOI:10.11862/CJIC.2016.116

*Chinese J. Inorg. Chem.*, **2016**,32:968-974

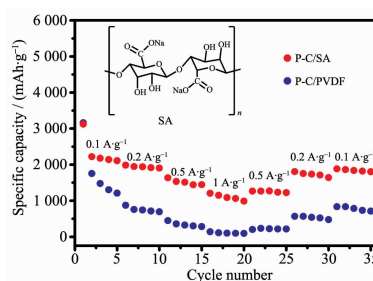
### Articles

#### Sodium Alginate Binder for Red Phosphorus-Carbon Anode of Sodium Ion Batteries

ZHAO Lin-Jing, ZHAO Qinxg, NIU Zhi-Qiang, LIANG Jing, TAO Zhan-Liang, CHEN Jun

DOI:10.11862/CJIC.2016.142

*Chinese J. Inorg. Chem.*, **2016**,32:929-934



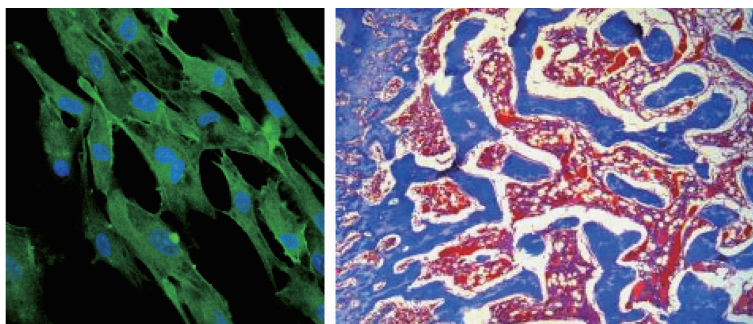
By using alginate (SA) as the binder, the P-C composite has been prepared as a anode material for sodium-ion batteries. The formation of chemical interactions between active materials and SA is the reason for the enhanced electrochemical property of the P-C composite.

#### Degradability and Osteogenesis of Mesoporous Magnesium Silicate Modified Calcium Sulphate Bone Cement

CHEN Jie, DONG Xie-Ping, LIU Zheng-Hui, HU-Xing-Long, WEI Jie

DOI:10.11862/CJIC.2016.125

*Chinese J. Inorg. Chem.*, **2016**,32:935-944



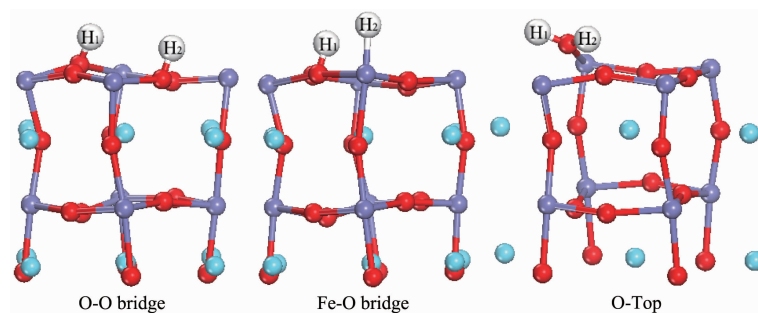
CLSM photo showed MC3T3-E1 cells cultured on 40m-MSC for 3 days, and Masson trichrome staining photo showed new bone tissue formation and materials degradation after 40m-MSC implanted *in vivo* for 12 weeks.

## First Principles Study on the Adsorption of H<sub>2</sub> Molecules on LaFeO<sub>3</sub> Surface

CHEN Yu-Hong, PAN Chang-Chang,  
ZHANG Mei-Ling, YUAN Li-Hua,  
ZHANG Cai-Rong, KANG Long,  
LUO Yong-Chun

DOI:10.11862/CJIC.2016.129

*Chinese J. Inorg. Chem.*, **2016**,**32**:945-953



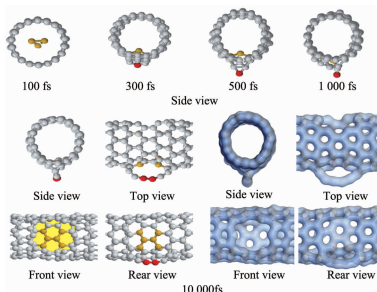
The study found that there are mainly three kinds of chemical adsorptions of H<sub>2</sub> molecules on the surface of LaFeO<sub>3</sub> (010): The first one is that H atoms are adsorbed to the O atom, forming -OH group; The second one is that one H atom is adsorbed to the Fe atoms, forming a metal bond; The last one is that two H atoms are adsorbed to the same O atom to form H<sub>2</sub>O molecules, and the H<sub>2</sub>O molecules can easily form oxygen vacancies.

## Collision Dynamics of a Carbon Ion Impinging a Single-Walled Carbon Nanotube

ZHANG Chao, WANG Dong-Qi,  
PAN Cheng-Ling, SHENG Shao-Ding

DOI:10.11862/CJIC.2016.131

*Chinese J. Inorg. Chem.*, **2016**,**32**:954-960



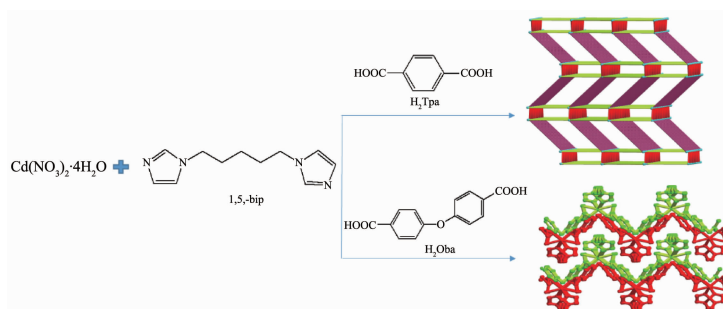
Atomic processes and the final charge density for the case of hollow site are shown when the incident energy is 60 eV. The yellow spheres and red spheres indicate the atoms in the collided hexagonal ring and the two atoms on the rear surface, respectively.

## Two Different Cd(II) Coordination Polymers Based on a Flexible Bis(imidazole) and Different Dicarboxylate Co-ligands: Syntheses, Crystal Structures and Properties (English)

LU Jiu-Fu, ZHAO Cai-Bin, JIN Ling-Xia,  
SHI Juan, LI Li-Hua, GE Hong-Guang

DOI:10.11862/CJIC.2016.141

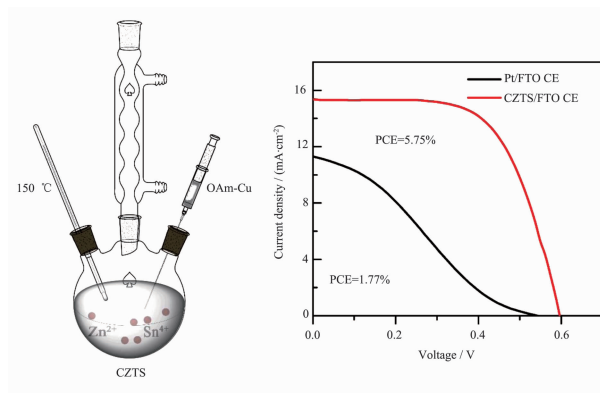
*Chinese J. Inorg. Chem.*, **2016**,**32**:961-967



Two mixed-ligand Cd(II) coordination polymers (CPs) of the formula [Cd<sub>2</sub>(μ<sub>2</sub>-H<sub>2</sub>O)(1,5-Bip)(Tpa)<sub>2</sub>]<sub>n</sub> (**1**), [Cd(1,5-Bip)(Oba)]<sub>n</sub> (**2**), where 1,5-Bip=1,5-bis(imidazole)pentane, H<sub>2</sub>Tpa=terephthalic acid, H<sub>2</sub>Oba=4,4'-oxybis(benzoic acid), were constructed. Complex **1** features a 3D network with a 5-connected (4<sup>6</sup>.6<sup>4</sup>) topology and complex **2** shows a 2D layer with a (4,4) topology.

## Copper Zinc Tin Sulfide: Synthesis and Photovoltaic Application

WANG Cong, ZHAO Qing-Fei, ZHANG Hua



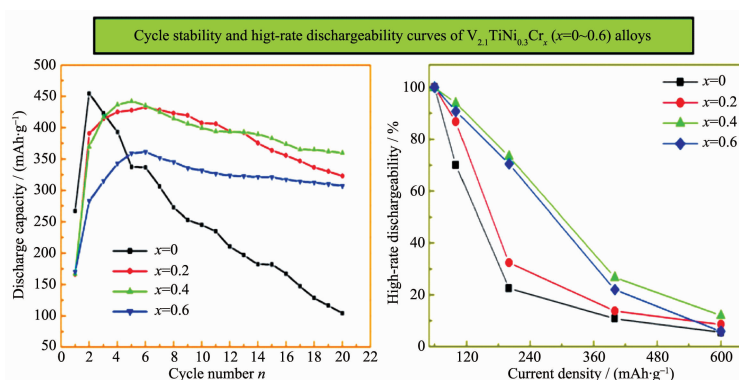
The conductivity and catalytic activity of the copper-deficient CZTS nanocrystals have been improved by tuning the amount of source materials during experiments. The recorded PCEs of 5.75% and 7.64% for CdSe and CdSeTe sensitized QDSCs based on CZTS/FTO counter electrodes have been achieved, respectively.

DOI:10.11862/CJIC.2016.116

*Chinese J. Inorg. Chem.*, **2016**,**32**:968-974

## Effect of Chromium Addition on Microstructures and Electrochemical Properties of $V_{2.1}TiNi_{0.3}$ Alloy

SONG Mao-Cheng, ZHANG Rong-Hua, ZHANG Xue-Feng, ZHAO Chao-Yong, CUI Xu-Mei, LIU Tian-Tian, TONG Yan-Wei, PANG Li-Juan, DENG Gang



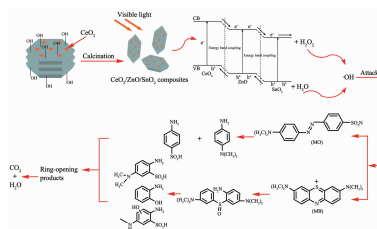
Cycle stability and high-rate dischargeability of  $V_{2.1}TiNi_{0.3}Cr_x$  ( $x=0\sim0.6$ ) alloys were significantly improved by adding the Chromium.  $V_{2.1}TiNi_{0.3}Cr_{0.4}$  alloy with the high-rate discharge performance of 73.40% and the capacity retention rate of 81.91% showed the best electrochemical properties among the investigated alloys.

DOI:10.11862/CJIC.2016.124

*Chinese J. Inorg. Chem.*, **2016**,**32**:975-982

## Photocatalytic Properties on Mixed-Dye by Ce-Contained Hydrotalcite-Derived Composite Oxides

XIA Sheng-Jie, SHAO Meng-Meng, XUE Ji-Long, NI Zhe-Ming



A series of  $CeO_2/ZnO/SnO_2$  composite oxides were successfully synthesized, while 20% Ce/Zn/Sn-700 °C with strong energy band coupling effect and narrow band gap displayed the best decomposition efficiency of mixed-dye.

DOI:10.11862/CJIC.2016.136

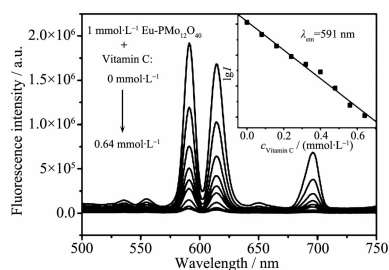
*Chinese J. Inorg. Chem.*, **2016**,**32**:983-993

# Spectroscopy of Vitamin C Based on the Reversible Color Change and Luminescence Switching Properties of Eu-PMo<sub>12</sub>O<sub>40</sub>

WANG Bin, WANG Xiao-Hong, WU Ying-Ga, ZHENG Jin-Hui, LIU Zong-Rui, BI Li-Hua, WU Li-Xin

DOI:10.11862/CJIC.2016.122

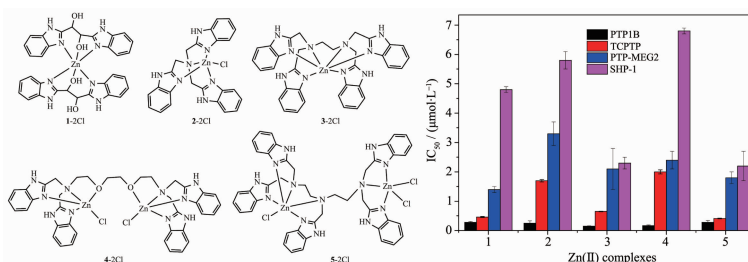
*Chinese J. Inorg. Chem.*, **2016**,**32**:994-1000



A reusable UV-Vis and fluorescence bi-functional sensor for the detection of Vitamin C was designed based on the reversible color change and luminescence switching polyoxometalate Eu-PMo<sub>12</sub>O<sub>40</sub>. The UV-Vis spectra and fluorescence spectra of Eu-PMo<sub>12</sub>O<sub>40</sub> solution were linearly changed when a certain amount of Vitamin C was added.

# PTPs Inhibition by Zinc(II) Complexes with Multi-benzimidazole Derivatives

CHEN Qing, LU Li-Ping



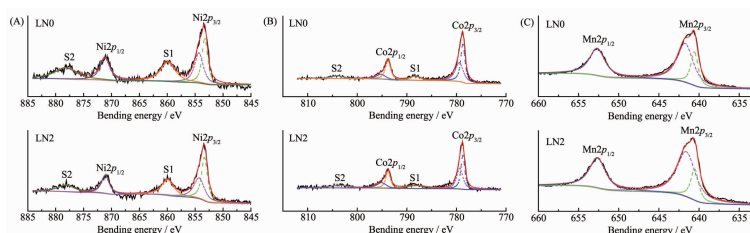
The PTPs inhibition of five zinc(II) complexes with multi-benzimidazole derivatives indicates that complexes **2** and **4** selectively inhibit PTP1B with IC<sub>50</sub> at range from 0.15 to 0.28 μmol·L<sup>-1</sup>, suggesting that the proper modification of the organic ligand moieties may result in screening potent and selective zinc (II)-based PTP1B inhibitors.

DOI:10.11862/CJIC.2016.123

*Chinese J. Inorg. Chem.*, **2016**,**32**:1001-1008

# Synthesis and Properties of Cathode Material Li<sub>1.0</sub>Na<sub>0.2</sub>Ni<sub>0.13</sub>Co<sub>0.13</sub>Mn<sub>0.54</sub>O<sub>2</sub> Prepared by Ball-Milling Assist High Temperature Solid State Method

WANG Li-Zhen, YI Zu-Liang, ZHANG Lin-Shen, FANG Hua, WANG Shi-Wen



By doping sodium for synthetic material, the proportion of Ni<sup>2+</sup>, Co<sup>3+</sup>, Mn<sup>4+</sup> was increased significantly. Furthermore, the stability and the electrochemical properties of the material was improved.

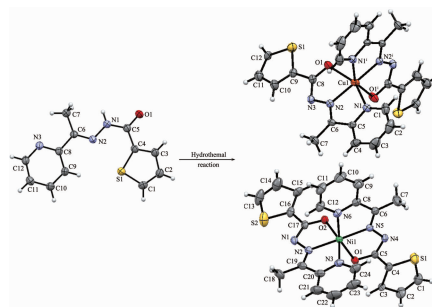
DOI:10.11862/CJIC.2016.138

*Chinese J. Inorg. Chem.*, **2016**,**32**:1009-1018



Hydrothermal Syntheses, Crystal Structures and Quantum Chemical Calculation of Copper(II) and Nickel(II) Complexes with 2-Acetylpyridine Thiophene-2-formyl Hydrazone Ligand

XIE Qing-Fan, LU Xiu-Nan, CHEN Fei-Peng, LI Ying, CHEN Yan-Min

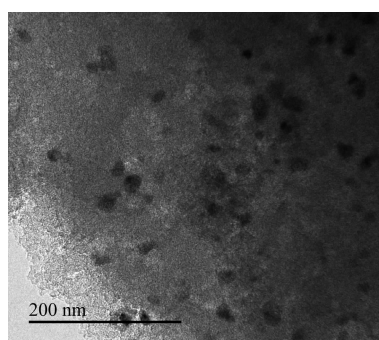


DOI:10.11862/CJIC.2016.135

*Chinese J. Inorg. Chem.*, **2016**,**32**:1019-1025

Absorbing Low-Concentration Mercaptan with Active Carbon Doped by Copper

LIU Hai-Di, LI Wei-Man, MA Xiang, CHEN Yun-Fa



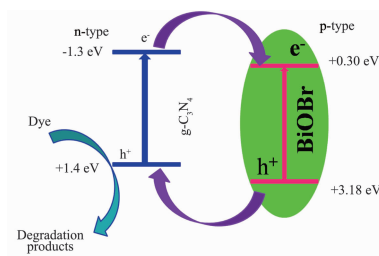
Active carbon doped by copper ( $0.7 \text{ mmol} \cdot \text{g}^{-1}$ ) calcined at  $300^\circ\text{C}$  under  $\text{N}_2$  showed the best adsorption ability to mercaptan with low concentration because of the high surface area and well distributed  $\text{Cu}_2\text{O}$  nanoparticles.

DOI:10.11862/CJIC.2016.121

*Chinese J. Inorg. Chem.*, **2016**,**32**:1026-1032

g- $\text{C}_3\text{N}_4$ -BiOBr Composites: Synthesis and High Photocatalytic Performance under Visible-Light Irradiation

LI Na, WANG Ming, ZHAO Bei-Ping, CAO Xue-Li



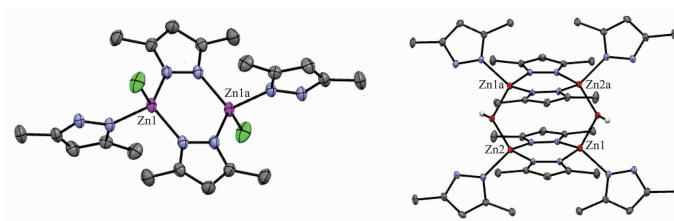
The heterostructure system with a firm interface of g- $\text{C}_3\text{N}_4$ -BiOBr composite photocatalysts could efficiently separate the interfacial electron-hole pair and accordingly improve the visible-light photocatalytic activity.

DOI:10.11862/CJIC.2016.134

*Chinese J. Inorg. Chem.*, **2016**,**32**:1033-1040

Syntheses, Structures and Spectra of Complexes of Zinc(II) with 3,5-Dimethylpyrazole

ZHU Xing-Cheng, HUANG Chao, ZHANG Qi-Long, ZHU Bi-Xue



The dinuclear complex  $[\text{Zn}_2(\text{HL})_2(\text{L})_2\text{Cl}_2]$  (**1**) is used as secondary ligand unit (sub unit) to give the tetranuclear zinc(II) complex  $[\text{Zn}_4(\text{HL})_4(\text{L})_4(\text{OH})_2](\text{BF}_4)_2$  (**2**) and the zinc ions of the same two sub units were bridged by two  $\mu\text{-O}$ .

DOI:10.11862/CJIC.2016.128

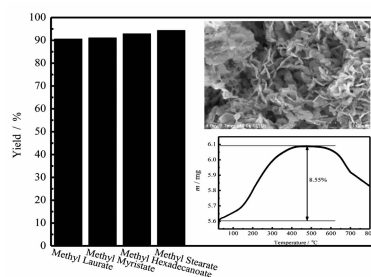
*Chinese J. Inorg. Chem.*, **2016**,**32**:1041-1046

## Effect of Dropping Sequence on the Preparation of Cu-Zn-Al-Ba Catalyst for Hydrogenation of Fatty Acid Esters

JIANG Zun-Biao, FAN Ming-Ming,  
ZHANG Ping-Bo, JIANG Biao

DOI:10.11862/CJIC.2016.120

Chinese J. Inorg. Chem., **2016**,**32**:1047-1054



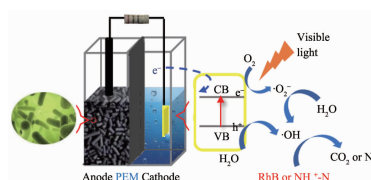
The structure of Cu-Zn-Al-Ba catalyst prepared by adding mixed salt solution to precipitation agent is more regular and the active centers  $\text{Cu}^0$  uniformly disperse, which endows the catalyst with excellent catalytic activity for hydrogenation of C12~C18 fatty acid methyl esters.

## Contaminants Removal by $\text{BiVO}_4$ Photocatalyst in PEC-MFC Coupling System

LI Yun, LIU Li-Fen

DOI:10.11862/CJIC.2016.139

Chinese J. Inorg. Chem., **2016**,**32**:1055-1062



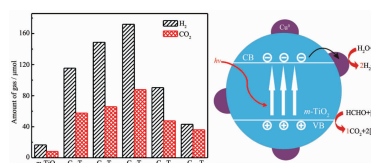
Both in the  $\text{BiVO}_4/\text{PEC-MFC}$  and  $\text{BiVO}_4/\text{EC-MFC}$  system, 95% of RhB and 75%  $\text{NH}_4^+\text{-N}$  can be degraded in 120 min and the  $E_{\text{ED}}$  are only 0.895 and 0  $\text{kWh} \cdot \text{m}^{-3}$ , respectively. The maximal cell voltage 0.427 V and power density 755.25  $\text{mW} \cdot \text{m}^{-2}$  can be achieved in the coupled bio-electrochemical and photo-electro-catalytic reactor.

## Stabilizing Metallic $\text{Cu}^0$ on the Surface of $m\text{-TiO}_2$ for Photocatalytic $\text{H}_2$ Production (English)

LIU Juan-Juan, QIAO Pei-Sheng,  
GUO Jun-Fang, ZOU Shi-Hui, XIAO Li-Ping,  
FAN Jie

DOI:10.11862/CJIC.2016.143

Chinese J. Inorg. Chem., **2016**,**32**:1063-1070



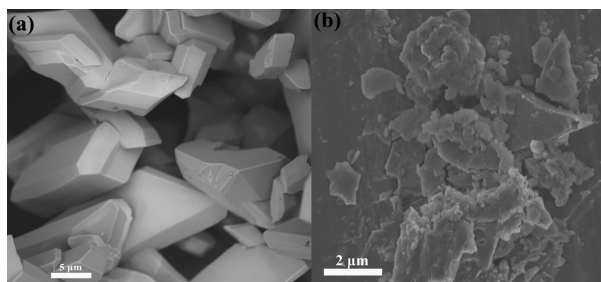
By utilizing dodecanethiol as a protective agent to stabilize the *in situ* generated  $\text{Cu}^0$  species, we showed that  $\text{Cu}^0$  particle could greatly improve the  $\text{H}_2$ -evolution rate of  $m\text{-TiO}_2$ . The maximum  $\text{H}_2$ -evolution rate of 725  $\mu\text{mol} \cdot \text{h}^{-1} \cdot \text{g}^{-1}$  is obtained on 1.0%  $\text{Cu}/m\text{-TiO}_2$ , with average  $\text{Cu}^0$  particle size of  $(4.2 \pm 0.9)$  nm.

## A Crystalline $\text{Pb(II)}$ Coordination Polymer: Synthesis, Crystal Structure, Exfoliation and Luminescent Property

WANG Peng-Fei, WU Xiao-Shuo,  
LU Peng-Peng

DOI:10.11862/CJIC.2016.137

Chinese J. Inorg. Chem., **2016**,**32**:1071-1077



$[\text{Pb}(4\text{-NPA})(\text{H}_2\text{O})]_n$  (**1**) with a layered structure is obtained via hydrothermal reaction. The layers can be exfoliated through the ultrasonic treatment using a "top-down" approach, resulting in 2D nanosheets. The bulk sample of **1**, and the exfoliated sample of **1** as well as its dispersion solution show similar luminescent properties.

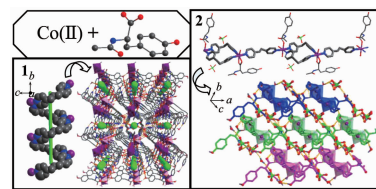


Syntheses, Crystal Structures and Properties of Two Homochiral Co(II) Complexes Based on *N*-Acetyl-*L*-tyrosine (English)

MA Ning, SONG Hui-Hua, YU Hai-Tao

DOI:10.11862/CJIC.2016.127

*Chinese J. Inorg. Chem.*, **2016**,**32**:1078-1088



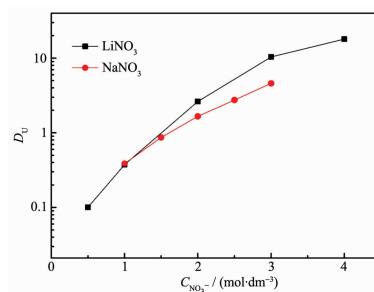
Two homochiral complexes  $[\text{Co}(\text{acty})(\text{bpp})_2(\text{H}_2\text{O})_2](\text{NO}_3) \cdot 2\text{H}_2\text{O}$  (**1**) and  $[\text{Co}_2(\text{acty})_2(\text{bpe})_3(\text{H}_2\text{O})_3](\text{ClO}_4)_2 \cdot 4\text{H}_2\text{O}$  (**2**) (Hacty = *N*-acetyl-*L*-tyrosine, bpp=1,3-di(4-pyridyl)propane, bpe=1,2-di(4-pyridyl)ethane) were synthesized. Complexes **1** and **2** exhibit a 1D right-handed helical chain and a 1D ribbon chain structure respectively, which are further extended into 3D supramolecular architectures through hydrogen-bonding interactions.

Extraction of U(VI) from Nitric Acid Medium by *N,N,N',N'*-Tetra-2-ethylhexyldiglycolamide in Sulfonated Kerosene (English)

CAI Xu-Can, CUI Yu, YANG Xiao-Feng, LI Ye-Xin, SUN Guo-Xin

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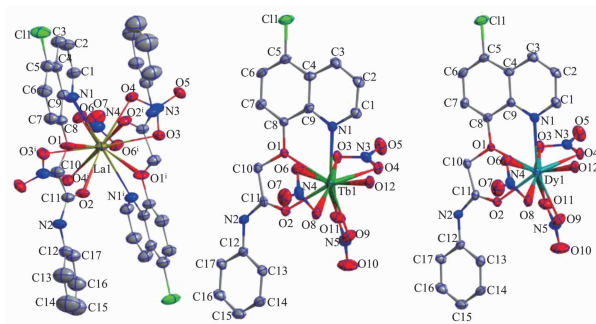
Uranium(VI) can be extracted effectively from nitric acid medium by T2EHDGA in sulfonated kerosene. The stoichiometry of the main extracted species was confirmed to be  $\text{UO}_2(\text{NO}_3)_2 \cdot 2\text{T2EHDGA}$ .

Lanthanide(La, Tb, Dy) Complexes with Quinolinylloxy Acetamide Ligand: Crystal Structures and Fluorescence Properties(English)

MAO Pan-Dong, YAN Ling-Ling, Wu Wei-Na, LIU Min-Qi, ZHOU Li-Hua, Fu Si-Lian

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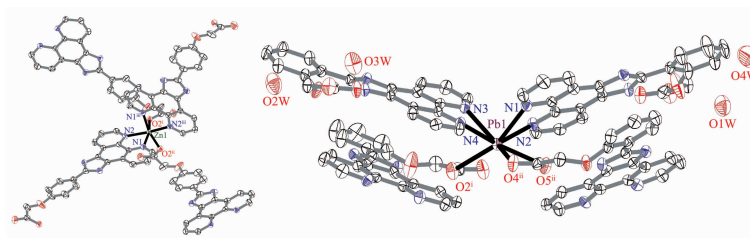
Three complexes,  $\text{LaL}_2(\text{NO}_3)_3 \cdot \text{CH}_3\text{CN}$  and  $\text{Ln}(\text{L})(\text{NO}_3)_3(\text{H}_2\text{O})$  [ $\text{Ln}=\text{Tb}$  and  $\text{Dy}$ ] have been synthesized and characterized. In solid state, Tb and Dy complexes could exhibit strong fluorescence emission in the visible region.

Syntheses, Structures and DNA  
Interaction of Zn(II) and Pb(II)  
Complexes Based on  
Imidazo-phenanthrolin-phenoxy Acetic  
Acid (English)

SHEN Wei, HU Wei-Ji, WU Xiao-Yong,  
ZHAO Guo-Liang

DOI:10.11862/CJIC.2016.132

*Chinese J. Inorg. Chem.*, **2016**,**32**:1101-1110



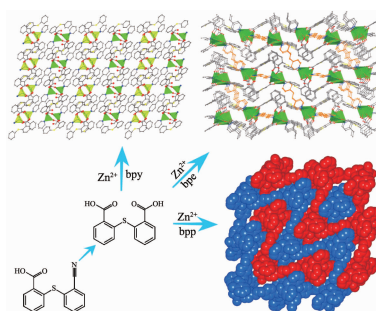
Two complexes were synthesized under hydrothermal reactions by using imidazo-phenanthrolinyl-phenoxy acetic acids. The fluorescence spectra indicate that the interaction of the complexes with DNA are stronger than ligands.

Three Dinuclear Zinc Coordination  
Polymers Constructed by 2,2'-Thiobis  
(benzoic acid) and Bipyridine Ligands  
(English)

HU Sheng, ZHOU Chang-Xia

DOI:10.11862/CJIC.2016.126

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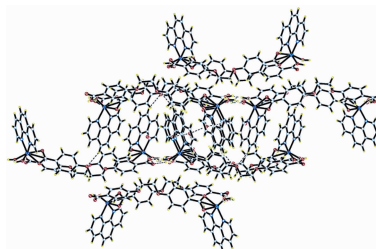
Syntheses, structures and photoluminescent properties of three coordination polymers  $[\text{Zn}_2(\text{tba})_2(\text{bpy})]_n$  (**1**),  $[\text{Zn}_2(\text{tba})_2(\text{bpe})]_n$  (**2**) and  $[\text{Zn}(\text{tba})(\text{bpp})]_n$  (**3**) (tba = 2,2'-thiobis (benzoic acid), bpy = 4,4'-bipyridine, bpe = 1,2-bis (4-pyridyl)ethylene, bpp = 1,3-bis(4-pyridyl)propane) are described. In the complexes the tba ligand develops various dinuclear zinc units, which are interlinked by the auxiliary bipyridine ligands with increased length and different conformations, displaying interesting structural diversity.

Syntheses, Crystal Structures and  
Theoretical Calculations of Nickel/  
Cobalt Supramolecular Coordination  
Compounds (English)

WANG Qing-Wei, SUI Wei, WANG Ya-Nan,  
LI Xiu-Mei, LIU Bo

DOI:10.11862/CJIC.2016.133

*Chinese J. Inorg. Chem.*, **2016**,**32**:1120-1126



Two metal-organic coordination compounds  $[\text{Ni}(\text{eoba})(\text{phen})(\text{H}_2\text{O})_2] \cdot 0.58\text{H}_2\text{O}$  (**1**) and  $[\text{Co}(\text{eoba})(\text{phen})(\text{H}_2\text{O})_2] \cdot \text{H}_2\text{O}$  (**2**) ( $\text{H}_2\text{eoba}$  = 4,4'-(ethane-1,2-diyl)diacetic acid, phen = 1,10-phenanthroline) have been hydrothermally synthesized and structurally characterized by elemental analysis, IR spectrum, TG and single-crystal X-ray diffraction. Complexes **1** and **2** exhibit two-dimensional supramolecular network through hydrogen bonds and  $\pi$ - $\pi$  interactions.