无 机 化 学 学 报

2019 年　　第 35 卷　　第 5 期

目　次

综　述

论　文

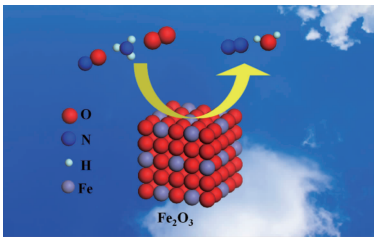
CHINESE JOURNAL OF INORGANIC CHEMISTRY

Vol.35 No.5 May 2019

CONTENTS

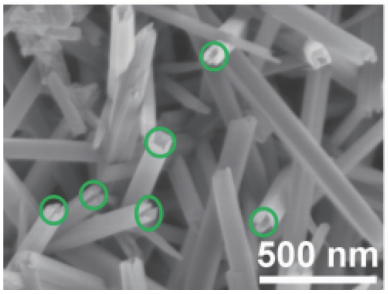
Cover

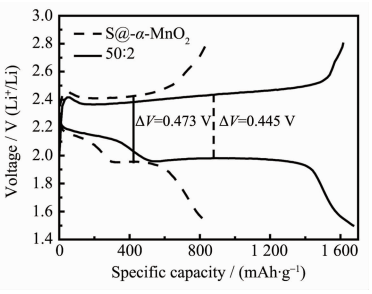
Reviews



Low-temperature NH_3-SCR has attracted considerable attention owing to the vast demand in industrial furnaces and its energy-conserving feature. This review summarizes the recent advances in the application of iron-based catalysts for the selective catalytic reduction of NO_x by NH_3.

Articles

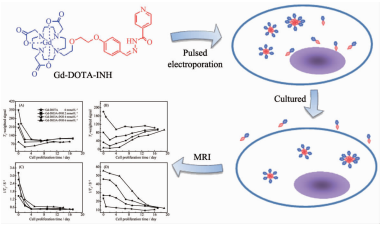




Urchin-like α-MnO_2-PEDOT nanotubes were fabricated through a facile template-free hydrothermal self-assembly in situ polymerization as sulfur host material for high performance lithium-sulfur batteries.

T_1/T_2 Relaxation and MRI Contrast Effect of Gd Agent in Different Intracellular Forms

SUN Xing-Li, ZHANG Yan-Hui, ZHAO Min-Min, TAN Bo, ZHANG Hai-Lu, DENG Zong-Wu

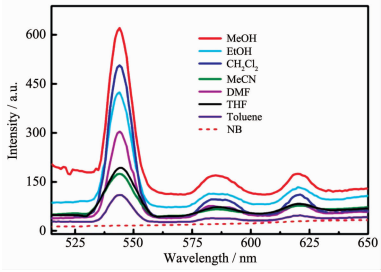


Gd-DO3A-INH as MRI contrast agent was introduced into hMSCs in two different forms: free Gd-DO3A-INH and Gd-DO3A-INH nanocluster. Cellular MRI discloses that free Gd-DO3A-INH is in favor of acceleration of T_1 relaxation and exhibits fast exocytosis, Gd-DO3A-INH nanocluster is in favor of acceleration of T_2 relaxation and exhibits promoted cell retention time, yielding a fast recovery of T_1-weighted contrast and a delayed recovery of T_2-weighted contrast during cell proliferation.

DOI:10.11862/CJIC.2019.100
Chinese J. Inorg. Chem., **2019**,**35**(5):780-786

One Terbium-Metal Organic Framework Based on a Tricarboxylate Ligand for Sensing of Small Molecule Solvents

LIN Hong, LÜ Ling-Zhi, FENG Yun-Long

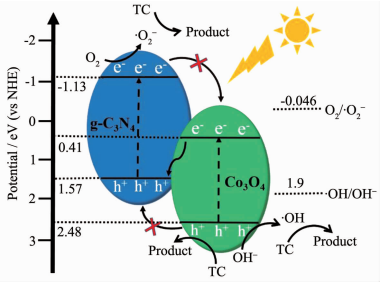


Tb-MOF exhibits highly selective and sensitive sensing for small organic molecules. The significant quenching in nitrobenzene indicates that it is potential luminescent sensing material for nitro explosives.

DOI:10.11862/CJIC.2019.103
Chinese J. Inorg. Chem., **2019**,**35**(5):787-792

Preparation and Photocatalytic Activity of Co_3O_4/g-C_3N_4 Composite Photocatalysts via One-Pot Synthesis

DUAN Li-Ying, LU Shan-Shan, DUAN Fang, CHEN Ming-Qing

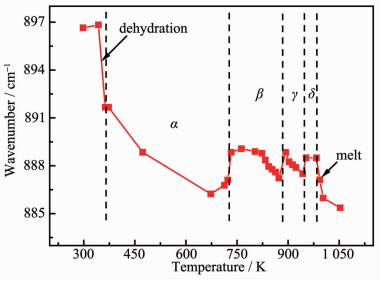


Co_3O_4/g-C_3N_4 composite photocatalysts with porous structure and high specific surface areas were prepared through a one-pot process. The formed Co_3O_4/g-C_3N_4 heterojunctions can effectively transfer the photon-generated carriers and decrease the recombination rate of electrons and holes, thus the photocatalytic activity can be effectively improved.

DOI:10.11862/CJIC.2019.087
Chinese J. Inorg. Chem., **2019**,**35**(5):793-802

Temperature Dependent Raman Spectra of $Na_2MoO_4 \cdot 2H_2O$ Crystal and Its Melt Structure

DING Ya-Ni, YOU Jing-Lin, WANG Min, LU Liming, WANG Jian, CAO Pei-Ming, XU Yan-Dong



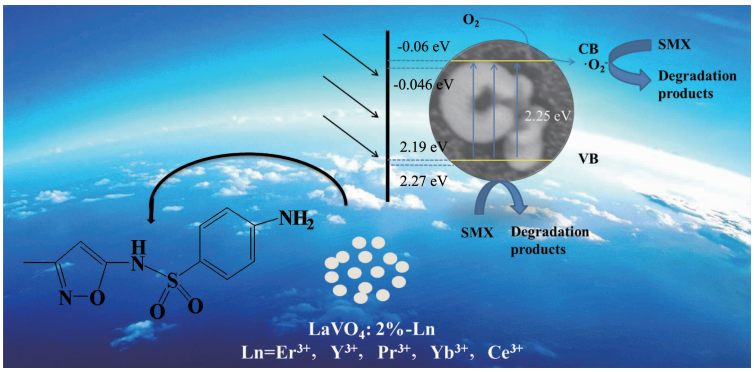
The $Na_2MoO_4 \cdot 2H_2O$ crystal undergoes the process of dehydration, phase transformation and melting while being heated. Temperature has significant effect on the wavenumber of Mo-O symmetric stretching vibrational mode of the isolated $[MoO_4]^{2-}$. Variations in the average bond length of Mo-O bonds in $[MoO_4]^{2-}$ can be derived.

DOI:10.11862/CJIC.2019.086
Chinese J. Inorg. Chem., **2019**,**35**(5):803-811

Prepatation and Photocatalytic Degratation Property of Antibiotics of Rare Earth Doped Microspherical $LAVO_4$ Photocatalysts

WANG Xiao-Li, ZHANG Lin-Ping, ZHOU Pei-Wen, ZHONG Yi, XU Hong, SUI Xiao-Feng, FENG Xue-Ling, CHEN Zhi-Ze, WANG Bi-Jia, MAO Zhi-Ping

DOI:10.11862/CJIC.2019.108
Chinese J. Inorg. Chem., **2019**,**35**(5):812-818

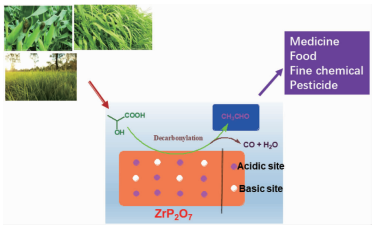


$LaVO_4$:2%-Ln (Ln=Er^{3+}, Y^{3+}, Pr^{3+}, Yb^{3+}, Ce^{3+}) photocatalyst produced $\cdot O_2^-$ and h^+ under light conditions to degrade antibiotic sulfamethoxazole (SMX).

Green Synthesis of Acetaldehyde at Low Temperature: Decarbonylation of Lactic Acid Catalyzed by Zirconium Pyrophosphate

TANG Cong-Ming, ZHANG Yu, LI Xin-Li, TAN Ping-Hua, ZOU Wei-Xin, DONG Lin, PANG Jun, ZHANG Ju

DOI:10.11862/CJIC.2019.109
Chinese J. Inorg. Chem., **2019**,**35**(5):819-827

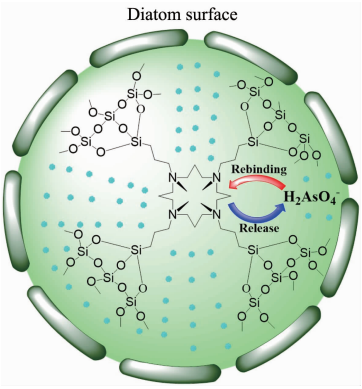


Zirconium pyrophosphate offered an excellent activity and durability for decarbonylation of lactic acid to acetaldehyde ascribing to moderate acidic sites and basic sites.

Preparation and Properties of Aminated Diatom-Based As(Ⅴ) Imprinted Composites

LIANG Xiao-Ming, ZHONG Yi-Jian, MA Li-Li, LI Cong, YANG Qin-Tao, CHEN Nan-Chun, XIE Qing-Lin

DOI:10.11862/CJIC.2019.102
Chinese J. Inorg. Chem., **2019**,**35**(5):828-836

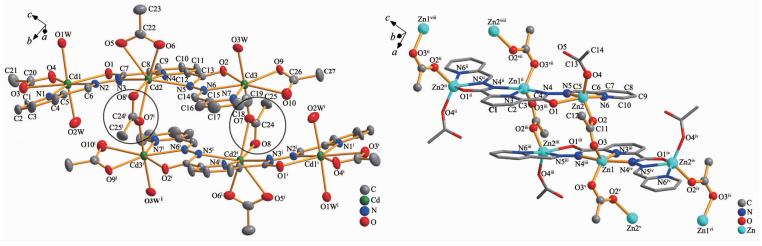


A diatom-based As(Ⅴ) imprinted composite material was prepared by using diatom as a carrier, and the functional group amino group was grafted on the surface of the diatom by APS modification. An As(Ⅴ) blot recognition site was formed on the surface of the diatom through the ECH cross-linking agent.

Syntheses, Crystal Structures, and Fluorescence Properties of 0D Hexanuclear Cadmium(Ⅱ) Grid Complex and 1D Zinc(Ⅱ) Coordination Polymer Constructed by Acetate-Bridge

LU Sheng-Nan, WU Wen-Shi, SHI Feng-Xiang, QUAN Zhi-Long

DOI:10.11862/CJIC.2019.098
Chinese J. Inorg. Chem., **2019**,**35**(5):837-843

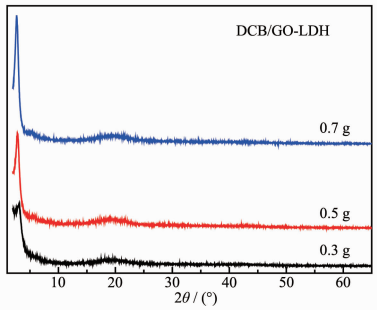


Two new compounds have been successfully synthesized based on ligand Tppahz. It is obviously clear that the complex **1** is a grid structure, in triclinic, space group $P\bar{1}$. The complex **2** is a one-dimensional chain structure, belongs to monoclinic system, and space group $C2/c$.

Preparation and Property of Zwitterionic Surfactants Intercalation into Graphene Oxide-Layered Double Hydroxide Hybrid

LIU Jie-Xiang, LIU Chang-Xia, CHEN Lu-Jia, ZHANG Xiao-Guang

DOI:10.11862/CJIC.2019.122
Chinese J. Inorg. Chem., **2019**,**35**(5):844-854

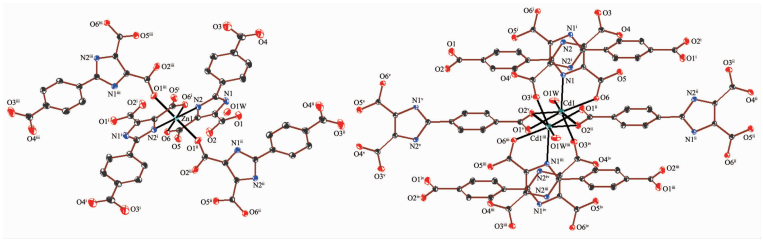


Dodecyl dimethyl carboxylbetaine (DCB) and dodecyl dimethyl sulfobetaine (DSB) were successfully intercalated into graphene oxide-layered double hydroxide (GO-LDH). The DCB/GO-LDH and DSB/GO-LDH prepared in water had the greater *d*-spacing values. CPF-DCB/GO-LDH displayed the slow release property.

Syntheses, Crystal Structures and Properties of Transition Metal Coordination Polymers Constructed by 2-(4′-Carboxyphenyl)-1*H*-imidazole-4,5-dicarboxylic Acid

LU Ya, GUAN Quan-Yin, ZHANG Min-Zhi, ZHAO Guo-Liang

DOI:10.11862/CJIC.2019.105
Chinese J. Inorg. Chem., **2019**,**35**(5):855-864

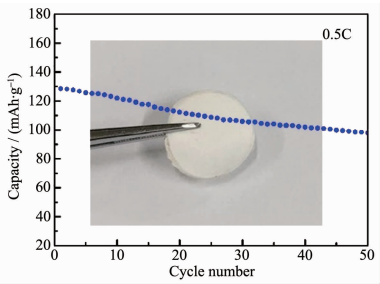


Four transition metal complexes of two series, $\{[M(H_3L)_2]\cdot 2H_2O\}_n$ (M=Zn (**1**), Cd (**2**), Co (**3**)), $[Cd(H_2L)H_2O]_n$ (**4**) have been synthesized by solvothermal reaction from 2-(4′-carboxyphenyl)-1*H*-imidazole-4,5-dicarboxylic acid (H_4L) and characterized by IR, EA, TG, single crystal X-ray diffraction.

Preparation and Electrochemical Performance of Ceramic/Polymer-Based Quasi-Solid Composite Electrolyte

SUN Qiu-Shi, ZHU Chong-Jia, XIE Jian, CAO Gao-Shao, ZHAO Xin-Bing, ZHENG Dong, JIN Yuan, WANG Kang-Yan, GUO Yong-Bin, TU Fang-Fang

DOI:10.11862/CJIC.2019.097
Chinese J. Inorg. Chem., **2019**,**35**(5):865-870



A quasi-solid electrolyte obtaineda high ionic conductivity of 1.3×10^{-4} S·cm^{-1} at room temperature and the $LiFePO_4$/Li cell with the electrolyte delivers a high discharge capacity of 128.4 mAh·g^{-1} and remained 80% of initial capacity after 50 cyclesat 0.5C.

Growth of α-HgI_2 Crystal in HgI_2-HI-H_2O Solution by Applying Electric Field

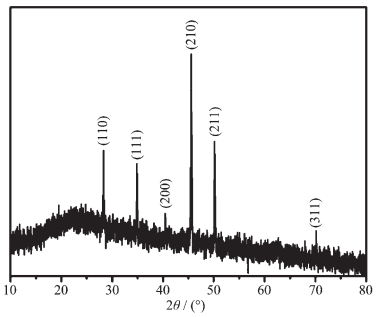
XU Gang, ZHANG Gai, YANG Cong-Xiao, CHEN Jing, HOU Yan-Nan, LI Jun-Ying, GU Zhi

DOI:10.11862/CJIC.2019.095
Chinese J. Inorg. Chem., **2019**,**35**(5):871-875

Morphology of α-HgI_2 crystal in HgI_2-HI-H_2O solution by applying electric field is an evidence that $[HgI_3]^-$ and $[HgI_4]^{2-}$ are also growth unit besides HgI_2.

Facile Solid-State Synthesis and Magnetic Properties of Cobalt Monosilicide (Englsih)

ZHU Bing-Long, LU Ling-Jing, DAI Wei-Cheng, ZHANG Ci-Yang, FANG Li-Wei, WANG Di, WANG Jia-Jian

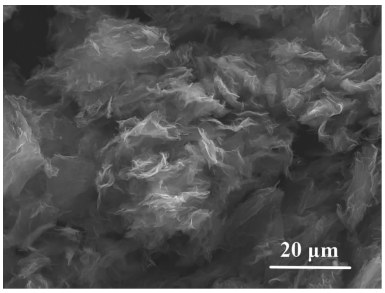


Cobalt monosilicide (CoSi) particles have been synthesized by utilizing cobalt oxide (Co_3O_4), silicon (Si) powder and metallic magnesium (Mg) as raw materials in a stainless steel autoclave.

DOI:10.11862/CJIC.2019.110
Chinese J. Inorg. Chem., **2019**,**35**(5):876-880

Synthesis of Al/graphene Composite Powder by Organic Phase Electroless Aluminum Plating (English)

DUAN Zheng, XU Ming-Ying, GAO Jian-Feng, HAO Min, LIU Yan, MA Jie, BAI Pei-Kang

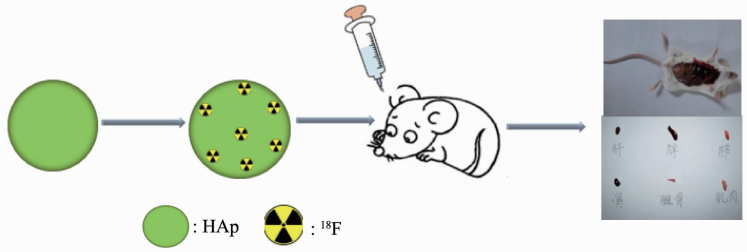


The Al/graphene composite powder was prepared in the organic phase by a simple method of electroless aluminum method. The effect of aluminum-plating is excellent, and aluminum can be well dispersed on the surface and interlayer of the graphene in the form of pure element.

DOI:10.11862/CJIC.2019.096
Chinese J. Inorg. Chem., **2019**,**35**(5):881-890

Hydroxyapatite Loaded Radiolabeled ^{18}F as Molecular Imaging Nanoprobes for Biomedical Application (Englsih)

WU Rui, LU Jiu-Fu, SONG Juan, LIU Cun-Fang, ZHANG Qiang, TIAN Guang-Hui

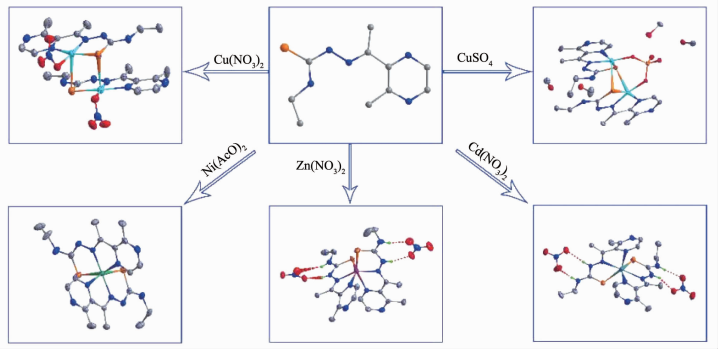


^{18}F was firmly doped in the synthesis process of HAp NPs in trace by strong chemical bond with the advantage of high load and prevention of radiation leakage. The designed PET probe was applied to the rats by tail vein to target to viscera organs.

DOI:10.11862/CJIC.2019.120
Chinese J. Inorg. Chem., **2019**,**35**(5):891-900

Crystal Structures and Fluorescence Properties of Five Transition Metal Complexes with Pyrazine Thiosemicarbazone (English)

GAO Liang-Liang, HUANG Shan-Xiu, KANG Rui-Fang, DAI Geng-Geng, WU Wei-Na, WANG Yuan, CHEN Zhong

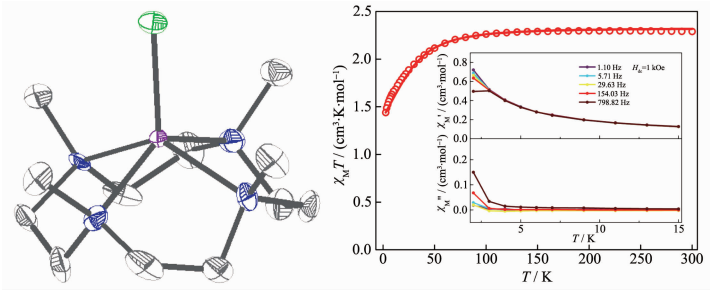


Ni(Ⅱ)/Zn(Ⅱ)/Cd(Ⅱ)/Cu(Ⅱ) complexes based on a thiosemicarbazone ligand containing a pyrazine unit have been synthesized and characterized. The fluorescence spectra indicate that the interactions of the complexes with DNA are stronger than that of the ligand.

DOI:10.11862/CJIC.2019.065
Chinese J. Inorg. Chem., **2019**,**35**(5):901-909

Crystal Structure and Magnetic Property of a Pentacoordinate Mononuclear Cobalt(Ⅱ) Complex (English)

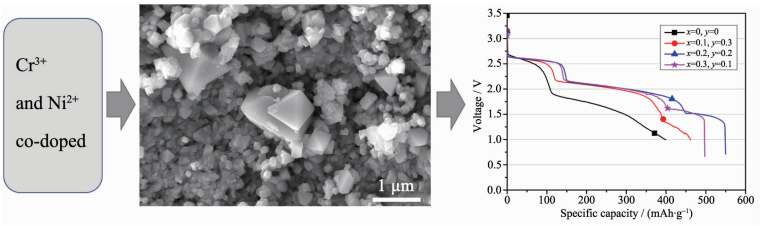
ZHANG Cui-Juan, Sukhen Bala, NI Zhao-Ping, TONG Ming-Liang



DOI:10.11862/CJIC.2019.104
Chinese J. Inorg. Chem., **2019**,**35**(5):910-914

Cr^{3+} and Ni^{2+} Co-doped Spinel Oxide Cathode with Improved Capacity and Voltage Stability in Thermal Battery for Geothermal Borehole (English)

SONG Heng-Xu, NIU Yong-Qiang, ZHAO Yu-Hong, LIAN Dong-Xiao, REN Jing-Xia, ZHANG Yan-Yan, HOU Hua

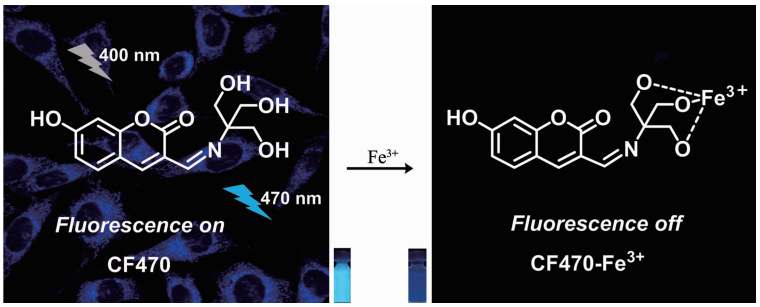


The $LiCr_xNi_yMn_{2-x-y}O_4/LiNO_3$-$KNO_3$/Li-Mg-B battery system has a more significant improvement in discharge performance because the doping of chromium and nickel enhances the structural stability of spinel lithium manganate oxides.

DOI:10.11862/CJIC.2019.118
Chinese J. Inorg. Chem., **2019**,**35**(5):915-922

A Highly Selective Coumarin-based Fluorescent Probe for Detecting Fe^{3+} in Pure Water Systems and Living Cells (English)

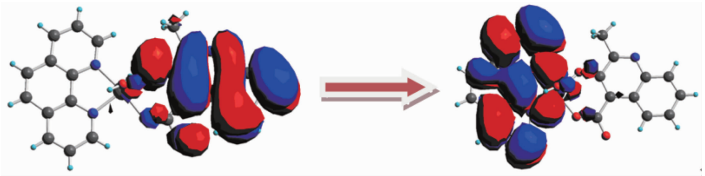
LIU Qi-Meng, WANG Huan, GUO Hao-Ran, GUO Yuan



DOI:10.11862/CJIC.2019.090
Chinese J. Inorg. Chem., **2019**,**35**(5):923-929

Synthesis, Crystal Structure, Theoretical Calculation and Properties of Cu(Ⅱ) Complex with 3-Hydroxy-2-methylquinoline -4-carboxylic Acid (English)

FANG Xiao-Niu, LI Jia, YI Xiu-Guang, YI Zhi-Qiang, CHEN Jia-Yi, LI Yong-Xiu



A novel copper(Ⅱ) complex shows blue violet photoluminescence emission, which can be attributed to ligand-to-ligand charge transfer (LLCT), as revealed by TDDFT calculations. Solid-state diffuse reflectance measurement shows the existence of a narrow optical band gap of 1.91 eV.

DOI:10.11862/CJIC.2019.111
Chinese J. Inorg. Chem., **2019**,**35**(5):930-936