无 机 化 学 学 报

2021年　　第37卷　　第9期

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Vol.37 No.9 Sep. 2021

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Synthesis, Characterization and Thermal Behavior of Lanthanide Metal Complexes Based on 1*H*,1′*H*-5,5′-Bitetrazole-1,1′-diolate

LUO Li-Qiong, WANG Cong-Jun, SHEN Juan, JIN Bo, PENG Ru-Fang

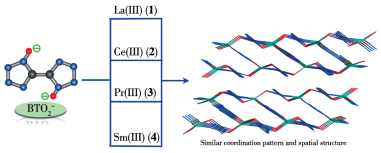
DOI:10.11862/CJIC.2021.168
Chinese J. Inorg. Chem., **2021**,**37**(9):1529-1535

Articles

Synthesis, Characterization and Thermal Behavior of Lanthanide Metal Complexes Based on 1*H*,1′*H*-5,5′-Bitetrazole-1,1′-diolate

LUO Li-Qiong, WANG Cong-Jun, SHEN Juan, JIN Bo, PENG Ru-Fang

DOI:10.11862/CJIC.2021.168
Chinese J. Inorg. Chem., **2021**,**37**(9):1529-1535

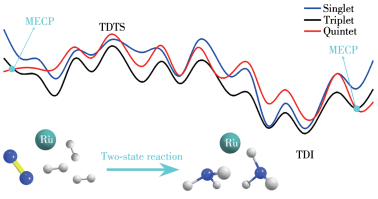


Using 1*H*,1′*H*-5,5′-bitetrazole-1,1′-diolate (H_2BTO) as ligand and lanthanide metal ions as metal centers, five energetic metal complexes were prepared via solvothermal method. Complexes **1**~**4** have similar coordination pattern and 2D layer-like structure.

Two-State Reaction Mechanism of Ammonia Synthesis from N_2 and H_2 Catalyzed by Ru

WU Jing-Jing, WANG Yong-Cheng, KANG Juan-Xia

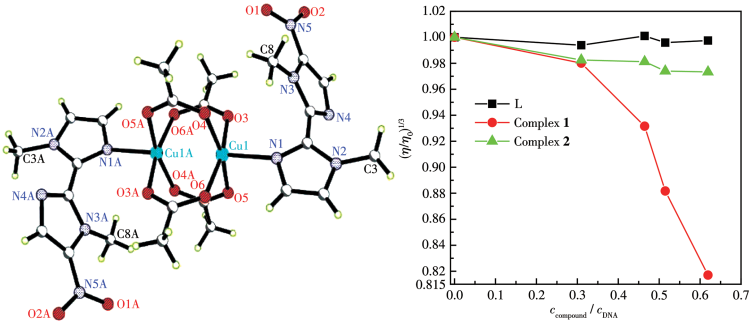
DOI:10.11862/CJIC.2021.184
Chinese J. Inorg. Chem., **2021**,**37**(9):1536-1546



The reaction of Ru catalyzing N_2 and H_2 to synthesize NH_3 is a typical two-state reaction. The spin-orbital coupling constant and intersystem crossing probability catculated of minimum energy crossing point (MECP). Energy span model was used to determine that turnover frequency (TOF)-determining transition state (TDTS) of the reaction is ^{3}TS2-3 and TOF-determining intermediate (TDI) of the reaction is ^{3}IM9.

Synthesis, Crystal Structure and Biological Activity of Cu(Ⅱ) and Ag(Ⅰ) Complexes Involving Nitroimidazole Derivative

YANG Li-Ning, LIU Chun-Ye, CHENG Zhao, LIANG Ling-Ling, ZHANG Jian

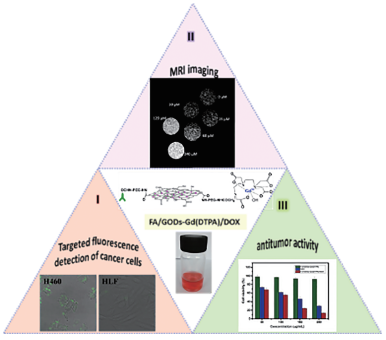


N,*N*′-dimethyl-5-nitro-2,2′-bimidazole and its complexes **1**, **2** were synthesized. Complex **1** exhibits five-coordinated dimeric copper-acetato paddle-wheel geometry. DNA interaction studies indicated that complex **1** revealed slightly stronger DNA binding capability than complex **2** and the ligand.

DOI:10.11862/CJIC.2021.186
Chinese J. Inorg. Chem., **2021**,**37**(9):1547-1554

Synthesis of Fluorescence/MRI Dual Targeted Imaging Theranostics Reagent

CHEN Qing-Tao, SHI Xiang-Dong, LIANG Wei-Wei, JIANG Li-Ying, FANG Shao-Ming, CHEN Feng-Hua

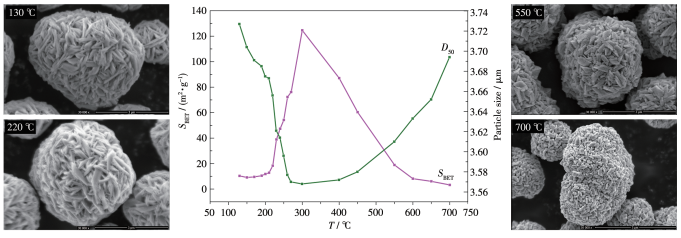


The prepared fluorescence/MRI dual targeted imaging diagnostic reagents (FA/GODs-Gd(DTPA)/DOX) could effectively target detection of cancer cells with high expression of folate receptor and also displayed significant anti-tumor activity.

DOI:10.11862/CJIC.2021.181
Chinese J. Inorg. Chem., **2021**,**37**(9):1555-1562

Impact of Temperature on Physico-chemical Properties of $Ni_{0.65}Co_{0.1}Mn_{0.25}(OH)_2$ Precursor for Ternary Cathode Material

ZHANG Kun, XUE Xiao-Fei, XU Kai-Hua, MA Lin, LI Cong

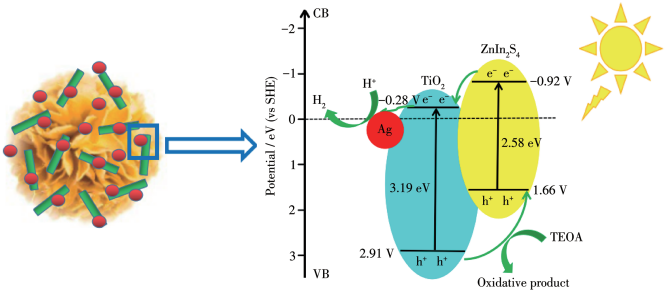


The changes for physicochemical parameters of $Ni_{0.65}Co_{0.10}Mn_{0.25}(OH)_2$ precursor were studied when dried or roasted between 130 and 700 ℃. On this basis, the evolution behaviors of phase, thermal stability and element valence state were further revealed during high temperature treatment.

DOI:10.11862/CJIC.2021.191
Chinese J. Inorg. Chem., **2021**,**37**(9):1563-1570

$ZnIn_2S_4/TiO_2/Ag$ Composite Photocatalyst: Preparation and Performance for Hydrogen Production from Water Splitting

WANG Lan, SHI Hang, ZHANG Huan, CHEN Qi-Xin, JIN Bao-Dan, ZHANG Hong-Zhong

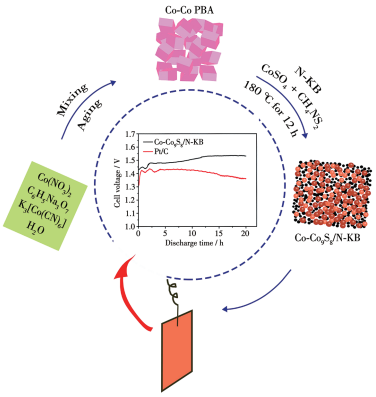


Herein, a novel ternary 3D $ZnIn_2S_4$ microsphere/1D TiO_2 nanobelt/0D Ag nanoparticle photocatalyst was created to achieve excellent photocatalytic H_2 evolution under simulated sunlight irradiation.

DOI:10.11862/CJIC.2021.187
Chinese J. Inorg. Chem., **2021**,**37**(9):1571-1578

Preparation and Catalytic Performance of Co-Co_9S_8/N-Doped Ketjen Black Composite for Oxygen Reduction Reaction

LI Fu-Zhi, CHEN Zhen, ZHANG Dan, SUN Ao-Kui, SHI Pu, HE Quan-Guo

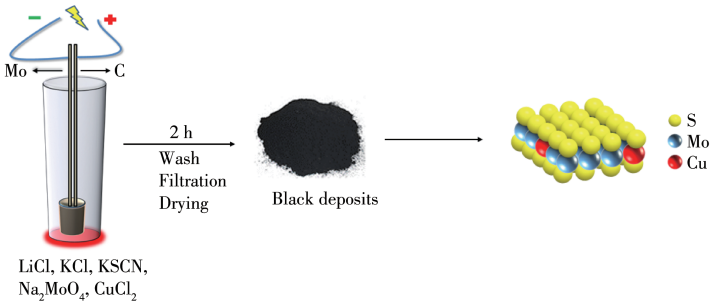


Co-Co_9S_8/N-KB (KB=Ketjen black) catalyst was successfully prepared for oxygen reduction reaction (ORR). When used in Al-air full battery, it displayed a discharge platform of 1.53 V, higher than that of the Pt/C.

DOI:10.11862/CJIC.2021.180
Chinese J. Inorg. Chem., **2021**,**37**(9):1579-1588

Preparation by Molten Salt Method of Cu/MoS_2 for Enhancement of Hydrogen Evolution Reaction Performance under Alkaline Condition

WANG Zi-Ming, LU Ya-Ning, TANG Meng, ZHANG Shuang, WANG Ying-Cai, ZHANG Zhi-Bin, LIU Yun-Hai, LIU Yu-Hui

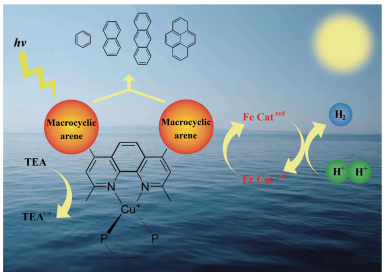


Cu/MoS_2 nanosheets prepared by the molten salt electrolysis method and transition metal Cu-doping exhibited excellent hydrogen evolution reaction catalytic performance in alkaline solution.

DOI:10.11862/CJIC.2021.197
Chinese J. Inorg. Chem., **2021**,**37**(9):1589-1596

Macrocyclic Arenes Derived Phenanthrolines: Design, Synthesis and Application at Heteroleptic Copper Complexes for Photocatalytic Hydrogen Evolution from Water

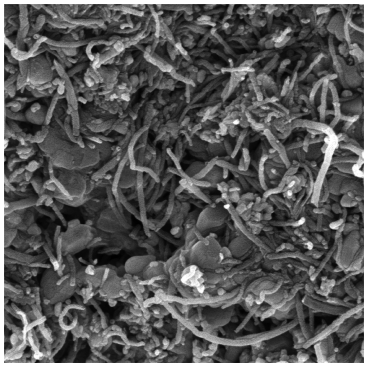
XU Meng, YU Xiao-Cong, LIU Xue-Fen, CHEN Hao, FAN Jin-Xuan, WANG Tian-Qi, WU Qing-An, LUO Shu-Ping



DOI:10.11862/CJIC.2021.188
Chinese J. Inorg. Chem., **2021**,**37**(9):1597-1605

Mesoporous Carbon-Carbon Nanotube-Copper Sulfide Composite Counter Electrodes: Synthesis and Application in Quantum Dot Sensitized Solar Cells

LIU Nan-Song, JI Xiao-He, ZHANG Hua

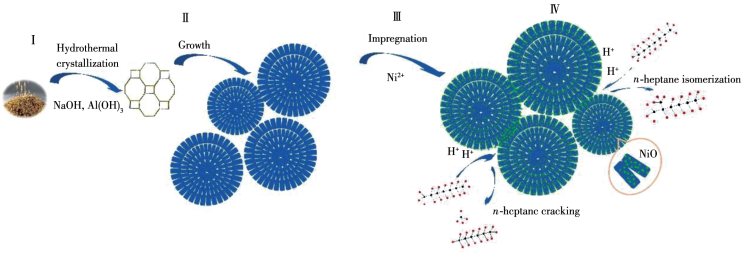


Ternary composite counter electrodes containing CuS, mesoporous carbon and carbon nanotube showed significantly improved power conversion efficiency, resulting from the synergetic effect of the two carbon materials on conductivity and the highly catalytic activity of CuS.

DOI:10.11862/CJIC.2021.176
Chinese J. Inorg. Chem., **2021**,**37**(9):1606-1612

Preparation of Rice Husk-Based High-Purity NaP1 Zeolite and Evaluation of Heptane Isomerization Performance

ZHANG Yang, CUI Yan-Hong, MA Shou-Tao, ZHANG Wei, WEI Yuan-Yuan, SUO Yan-Hua

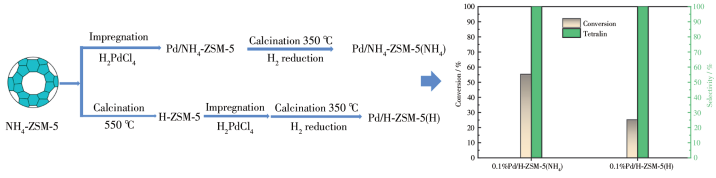


DOI:10.11862/CJIC.2021.192
Chinese J. Inorg. Chem., **2021**,**37**(9):1613-1624

The high-purity NaP1 zeolite prepared from rice husk can be used to catalyze the heptane isomerization reaction after loading mass ratio of 4% nickel.

Effects of Coordination Cations over Zeolite on Hydrogenation Performance of Pd/H-ZSM-5 Catalyst

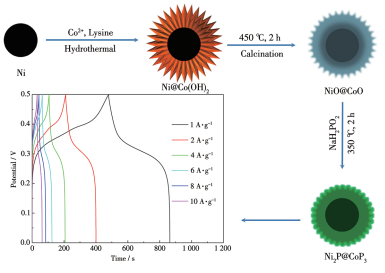
ZHANG Chuan-Hao, LU Ning-Yue, FAN Bin-Bin, LI Rui-Feng



DOI:10.11862/CJIC.2021.185
Chinese J. Inorg. Chem., **2021**,**37**(9):1625-1632

Synthesis and Characterization of $Ni_2P@CoP_3$ Core-Shell Nanospheres for Supercapacitors

WANG Ming, CAI Yuan-Yuan, YANG Yi, ZHU Dian, ZHANG Na-Na, WANG Mei-Fang, LI Xiang-Zi

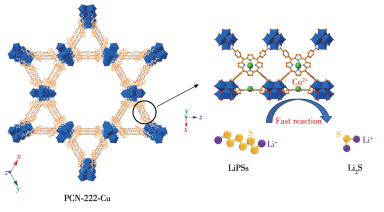


$Ni_2P@CoP_3$ core-shell nanospheres with diameter of ~400 nm has been obtained by hydrothermal and calcination in air or sodium hypophosphite vapor, it showed high specific capacitance (776.8 $F \cdot g^{-1}$) and long cycle stability (~134.11% of the initial value after 2 000 cycles at 10 $A \cdot g^{-1}$).

DOI:10.11862/CJIC.2021.194
Chinese J. Inorg. Chem., **2021**,**37**(9):1633-1641

Cu-Porphyrin Based Metal Organic Frameworks for High-Performance Lithium-Sulfur Batteries

WAN Si-Cheng, XIONG Bing-Qing, PAN Yuan-Yuan, QIU Chang-Ding, KE Fu-Sheng

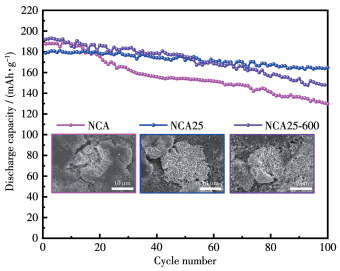


The Cu^{2+} in ligands of PCN-222-Cu can coordinate with N atoms in porphyrin to promote reaction kinetics of LiPSs and achieve great rate performance in Li-S batteries.

DOI:10.11862/CJIC.2021.125
Chinese J. Inorg. Chem., **2021**,**37**(9):1642-1648

Effect of Water Washing and Re-sintering Treatment on Microstructure and Electrochemical Properties of High Nickel Ternary Material $LiNi_{0.88}Co_{0.07}Al_{0.05}O_2$

MAO Gui-Hong, XIAO Fang-Ming, TANG Ren-Heng, HUANG Ling, LI Jian, WANG Ying

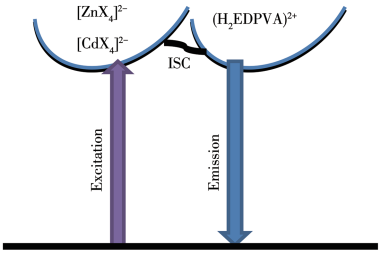


Removal of residual lithium compounds by water washing and re-sintering treatment reduces the generation of interfacial side reactions and effectively improves the discharge specific capacity and cycling performance of $LiNi_{0.88}Co_{0.07}Al_{0.05}O_2$ (NCA) under the suitable conditions.

DOI:10.11862/CJIC.2021.196
Chinese J. Inorg. Chem., **2021**,**37**(9):1649-1658

Structures and Photoluminescence Properties of Zinc(Ⅱ)/Cadmium(Ⅱ)-Based Organic-Inorganic Hybrid Metal Halides Derived from (*E*)-*N*,*N*-Dimethyl-4-(2-(pyridin-4-yl)vinyl)aniline

WANG Shen-Yu, CHEN Dian, LIU Xiao-Li, WANG Shuo-Wen, YUAN Ya-Nan, WANG Zhen-Ping, YANG Chun

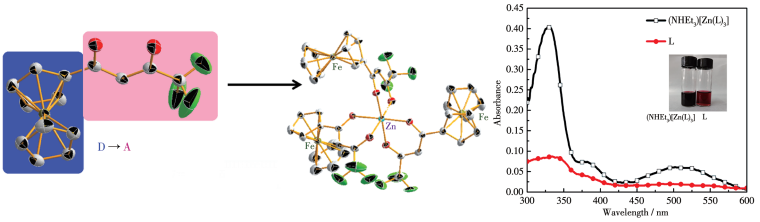


Based on $[MX_4]^{2-}$ (M=Zn, Cd; X=Cl, Br) and di-protonated (*E*)-*N*,*N*-dimethyl-4-(2-(pyridin-4-yl)vinyl)aniline, four ionic mononuclear organic-inorganic hybrid metal halides with blue emission were prepared and structurally characterized.

DOI:10.11862/CJIC.2021.198
Chinese J. Inorg. Chem., **2021**,**37**(9):1659-1664

Design, Synthesis, Electrochemical Activity and Multiphoton Absorption of Ferrocenyl Diketone Zn(Ⅱ) Complex

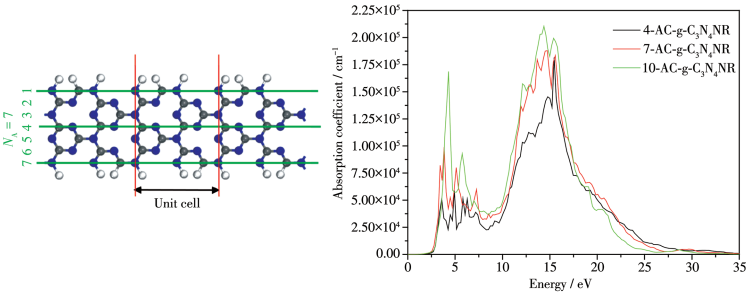
XIE Qing-Yuan, LI Dan, LI Dan-Dan, LI Sheng-Li, WU Jie-Ying, ZHANG Qiong, TIAN Yu-Peng



DOI:10.11862/CJIC.2021.183
Chinese J. Inorg. Chem., **2021**,**37**(9):1665-1673

First-Principles Calculations on Electronic Structures and Optical Properties of g-C_3N_4 Nanoribbons (English)

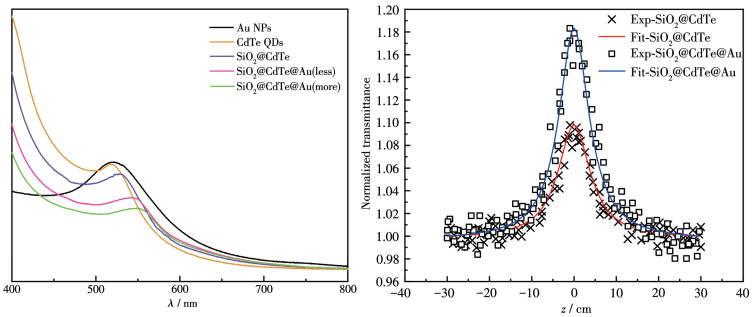
DU Xiu-Juan, MA Ke-Rong, ZHANG Zheng-Wei, YANG Wen, ZHANG Rui, ZHANG Qing-Mei



DOI:10.11862/CJIC.2021.178
Chinese J. Inorg. Chem., **2021**,**37**(9):1674-1682

Preparation and Nonlinear Absorption Properties of SiO_2@CdTe@Au Composite Nanoparticles (English)

CHANG Qing, GUAN Jing, MENG Tian-Ming

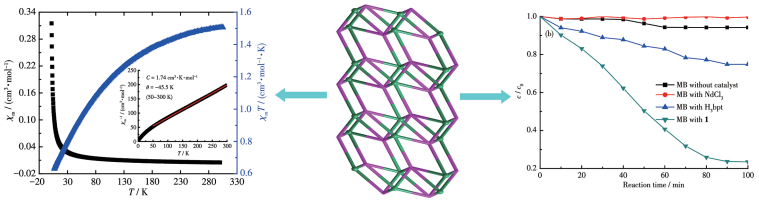


SiO_2@CdTe@Au presented enhanced nonlinear optical absorption characteristics compared to SiO_2@CdTe. The main reason is the surface plasmon resonance enhancement effect of Au nanoparticles.

DOI:10.11862/CJIC.2021.195
Chinese J. Inorg. Chem., **2021**,**37**(9):1683-1690

Synthesis, Structure, Luminescence, Photocatalytic and Magnetic Properties of a Neodymium Complex Constructed from Biphenyl-3,4′,5-tricarboxylic Acid (English)

ZHENG Huan, JIAO Yuan, FENG Si-Si

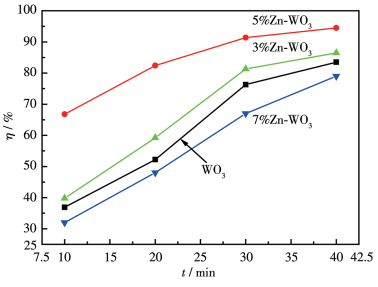


A neodymium MOF based on H_3bpt(biphenyl-3,4′,5-tricarboxylic acid) featuring 3D network structure exhibited strong emission, high photocatalytic efficiency for the degradation of MB and typical isolated Nd^{3+} magnet in the solid-state.

DOI:10.11862/CJIC.2021.193
Chinese J. Inorg. Chem., **2021**,**37**(9):1691-1699

Effect of Zn on Photocatalytic Activity of Block-Shaped Monoclinic WO_3 (English)

XIAO Zhong-Lian, WU Xuan-Yi, TAN He-Yun, Paolo Aprea, HAO Shi-You

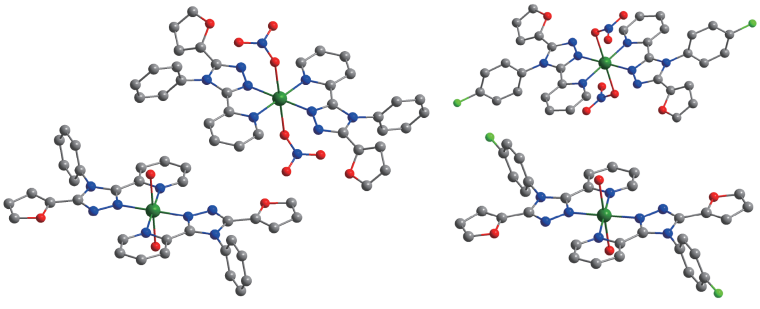


Effect of Zn doping on the photocatalytic efficiency of block-shaped monoclinic WO_3 was investigated and the results showed that mass ratio of 5% Zn doped WO_3 (5%Zn-WO_3) performed the best photocatalytic efficiency due to the formation of more oxygen vacancy and the increase of hydroxyl groups number.

DOI:10.11862/CJIC.2021.189
Chinese J. Inorg. Chem., **2021**,**37**(9):1700-1706

Coexistence of Two Unique Cu(Ⅱ) Ions in Mononuclear Cu(Ⅱ) Complexes with Furanyl Substituted Triaryltriazoles (English)

GAO Jian-Fei, NIE Rong-Rong, FENG Zhe, ZHU Dun-Ru



Two *trans*-mononuclear copper(Ⅱ) complexes with 3-(2-pyridyl)-4-phenyl-5-(2-furanyl)-1,2,4-triazole and 3-(2-pyridyl)-4-(*p*-fluorophenyl)-5-(2-furanyl)-1,2,4-triazole have been synthesized and structurally characterized.

DOI:10.11862/CJIC.2021.190
Chinese J. Inorg. Chem., **2021**,**37**(9):1707-1712