

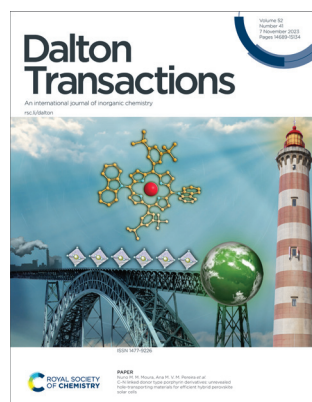
Dalton Transactions

An international journal of inorganic chemistry incorporating Acta Chemica Scandinavica
rsc.li/dalton

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

IN THIS ISSUE

ISSN 1477-9226 CODEN DTARAF 52(41) 14689–15134 (2023)



Cover

See Nuno M. M. Moura, Ana M. V. M. Pereira *et al.*, pp. 14762–14773.

Image reproduced by permission of Ana M. V. M. Pereira, Nuno M. M. Moura, Leonardo Rodrigues and José A. G. Pereira from *Dalton Trans.*, 2023, **52**, 14762.

The authors acknowledge Leonardo Rodrigues for the graphic design and José A. G. Pereira for the photographic work.



Inside cover

See Sheldon Sookai and Orde Q. Munro, pp. 14774–14789.

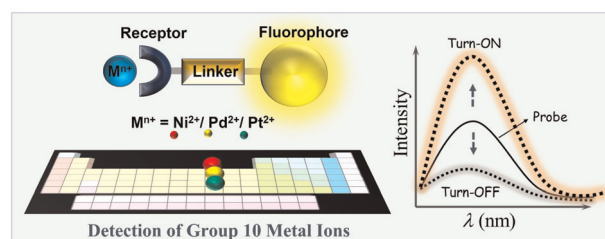
Image reproduced by permission of Orde Q. Munro from *Dalton Trans.*, 2023, **52**, 14774.

PERSPECTIVE

14704

Fluorescent and chromogenic organic probes to detect group 10 metal ions: design strategies and sensing applications

Nidhi Goswami, Sudhanshu Naithani, Jimmy Mangalam, Tapas Goswami, Ritesh Dubey, Pramod Kumar, Pankaj Kumar* and Sushil Kumar*

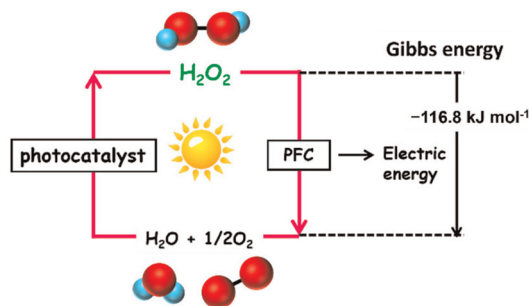


FRONTIER

14733

Hydrogen peroxide photo-fuel cells

Hiroaki Tada



Editorial Staff

Executive Editor

Sally Howells-Wyllie

Deputy Editor

Mike Andrews

Development Editors

Michelle Canning, Emily Cuffin-Munday

Editorial Production Manager

Susannah Davies

Publishing Editors

Debora Giovannelli, Helen Lunn, Samuel Oldknow, Kate Tustain

Editorial Assistant

Daphne Houston

Publishing Assistant

Huw Hedges

Publisher

Jeanne Andres

For queries about submitted articles please contact Susannah Davies, Editorial Production Manager in the first instance. E-mail dalton@rsc.org

For pre-submission queries please contact Sally Howells-Wyllie, Editor. Email dalton-rsc@rsc.org

Dalton Transactions (electronic: ISSN 1477-9234) is published 48 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK

Tel +44 (0)1223 432398; E-mail orders@rsc.org

2023 Annual (electronic) subscription price: £4441; US\$7972.

Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at www.rsc.org/ip

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017;

E-mail advertising@rsc.org

For marketing opportunities relating to this journal, contact marketing@rsc.org

Dalton Transactions

An international journal for high quality, original research in inorganic and organometallic chemistry incorporating Acta Chemica Scandinavica
rsc.li/dalton

Editorial Board

Chair

Russell Morris, University of St Andrews, UK

Associate Editors

Paola Ceroni, University of Bologna, Italy
Vadapalli Chandrasekhar, Indian Institute of Technology Kanpur, India
Maarit Karpinnen, Aalto University, Finland
Mi Hee Lim, Korea Advanced Institute of

Science and Technology, South Korea
Neal Mankad, University of Illinois at Chicago, USA
Warren Piers, University of Calgary, Canada
Wolfgang Tremel, Johannes Gutenberg-Universität, Germany
Takashi Uemura, University of Tokyo, Japan
Li-Min Zheng, Nanjing University, China

Members

Jaqueline Kiplinger, Los Alamos National Laboratory, USA
Sascha Ott, Uppsala University, Sweden

Advisory Board

Simon Aldridge, University of Oxford, UK
Santiago Alvarez, University of Barcelona, Spain
John Arnold, University of California, Berkeley, USA
Mu-Hyun Baik, KAIST, Korea
Jitendra Bera, IIT Kanpur, India
Eszter Borbas, Uppsala University, Sweden
Holger Braunschweig, Universität Würzburg, Germany
Xian-He Bu, Nankai University, China
Raffaella Buonsanti, École Polytechnique Fédérale de Lausanne, Switzerland
Claire Carmalt, University College London, UK
Eric Clot, University of Montpellier 2, France
Catherine Constable-Housecroft, University of Basel, Switzerland
Amitava Das, Indian Institute of Science and Education Research Kolkata, India
Jillian Dempsey, University of North Carolina, USA
Anjana Devi, Ruhr-University Bochum, Germany
Rasika Dias, University of Texas at Arlington, USA
Jairton Dupont, University of Nottingham, UK

William Evans, University of California, Irvine, USA
Harry B. Gray, California Institute of Technology, USA
Zijian Guo, Nanjing University, China
Michael Hayward, University of Oxford, UK
Todd W. Hudnall, Texas State University, USA
Ilich Ibarra, National Autonomous University of Mexico, Mexico
Cameron Jones, Monash University, Australia
Masako Kato, Hokkaido University, Japan
Takahiko Kojima, University of Tsukuba, Japan
Jian-Ping Lang, Suzhou University, China
Jennifer Love, University of British Columbia, Canada
Stuart Macgregor, Heriot Watt University, UK
Celia Machado Ronconi, Federal Fluminense University, Brazil
Laurent Maron, Université de Toulouse, France
Ellen Matson, Rochester University, USA
Marinella Mazzanti, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
Nils Metzler-Nolte, Ruhr-Universität Bochum, Germany
Barbara Milani, Università di Trieste, Italy
Georgii Nikonov, Brock University, Canada

Seiji Ogo, Kyushu University, Japan
Chris Orvig, University of British Columbia, Canada
Gerard Parkin, Columbia University, USA
Eric Rivard, University of Alberta, Canada
Douglas Stephan, University of Toronto, Canada
Matthias Tamm, Technische Universität Braunschweig, Germany
Jinkui Tang, Changchun Institute of Applied Chemistry, China
Thomas Teets, University of Houston, USA
Christine Thomas, The Ohio State University, USA
Ajay Venugopal, Indian Institute of Science Education and Research Thiruvananthapuram, India
Claudio N. Verani, Wayne State University, USA
Wai-yeung Wong, Hong Kong Baptist University, China
Zhiguo Xia, South China University of Technology, China
Zuowei Xie, Chinese University of Hong Kong, China
Lin Xu, East China Normal University, China

Information for Authors

Full details on how to submit material for publication in Dalton Transactions are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be made via the journal's homepage: rsc.li/dalton

Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of Chemistry, provided that any such republication is accompanied by an acknowledgement in the form: (Original Citation)–Reproduced by permission of the Royal Society of Chemistry.

This journal is © The Royal Society of Chemistry 2023.

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

Registered charity number: 207890

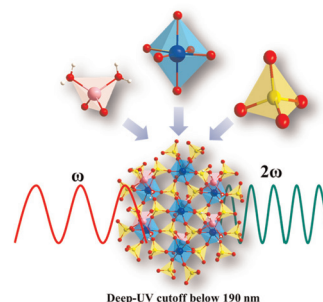


COMMUNICATIONS

14742

A lithium–scandium sulfate with second-harmonic generation response and deep-ultraviolet transparency

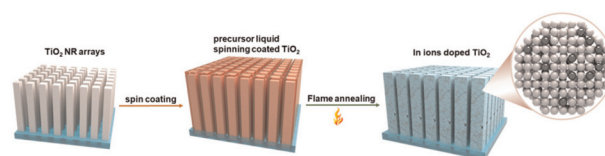
Zi-Long Geng, Hong-Xin Tang, Rui-Biao Fu,*
Zu-Ju Ma* and Xin-Tao Wu



14747

Flame doping of indium ions into TiO₂ nanorod arrays for enhanced photochemical water oxidation

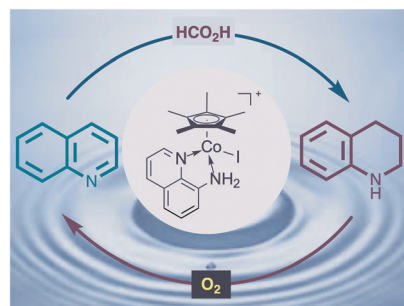
Xue Chen, Biyi Chen, Dan Li, Longhua Li, Dongbo Xu*
and Weidong Shi*



14752

Hydrogenation and dehydrogenation of N-heterocycles under Cp*Co(III)-catalysis

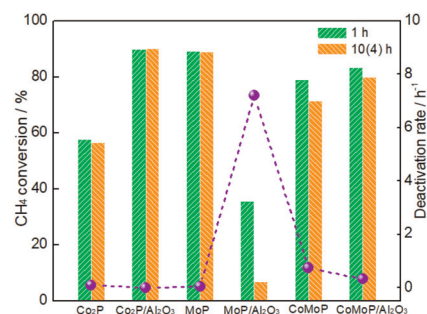
Pardeep Dahiya, Nidhi Garg, Rinaldo Poli and
Basker Sundararaju*



14757

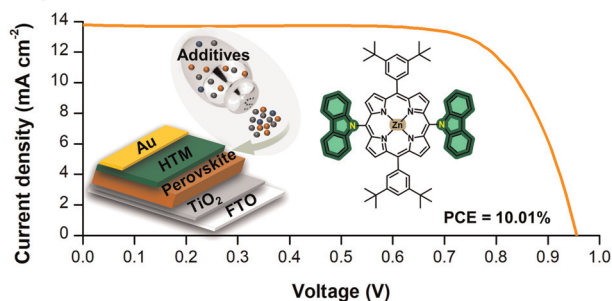
Interesting influence of Al₂O₃ on the catalytic stability of Co₂P, MoP and CoMoP catalysts for dry reforming of methane

Shuo Chen, Qingshan Rong, Dongmei Liu,* Na Sun and
Zhiwei Yao*



PAPERS

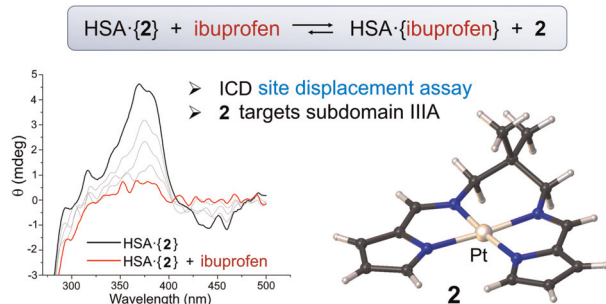
14762



C–N linked donor type porphyrin derivatives: unrevealed hole-transporting materials for efficient hybrid perovskite solar cells

Melani J. A. Reis, Ana T. Nogueira, Ana Eulálio, Nuno M. M. Moura,* Joana Rodrigues, Dzmityr Ivanou, Paulo E. Abreu, M. Rosário P. Correia, Maria G. P. M. S. Neves, Ana M. V. M. Pereira* and Adélio Mendes

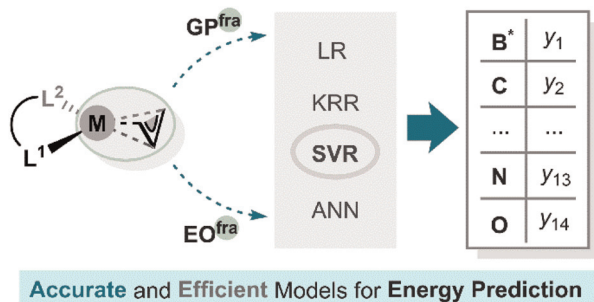
14774



Spectroscopic and computational study of the interaction of Pt(II) pyrrole-imine chelates with human serum albumin

Sheldon Sookai and Orde Q. Munro*

14790

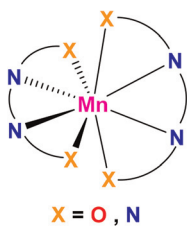


Using a single complex to predict the reaction energy profile: a case study of Pd/Ni-catalyzed ethylene polymerization

Han Lu, Xiaohui Kang, Hang Yu, Wenzhen Zhang and Yi Luo*

14797

8-coordinate Mn(II)-based SMMs



High coordination number (8)

Tunable magnetic properties

SMR behaviors in all compounds

Slow magnetic relaxation in 8-coordinate Mn(II) compounds

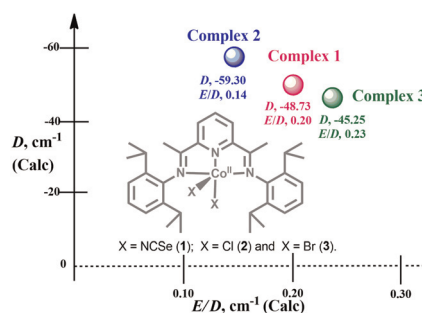
Li-Xin Wang, Xiao-Fan Wu, Xin-Xin Jin, Jia-Yi Li, Bing-Wu Wang,* Ji-Yan Liu,* Jing Xiang* and Song Gao



14807

Field induced single ion magnet behavior in Co^{II} complexes in a distorted square pyramidal geometry

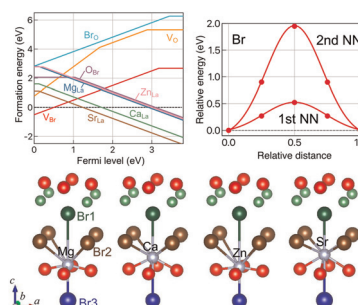
Atanu Dey,* Junaid Ali, Shruti Moorthy, Jessica Flores Gonzalez, Fabrice Pointillart,* Saurabh Kumar Singh* and Vadapalli Chandrasekhar*



14822

Mechanisms of point defect formation and ionic conduction in divalent cation-doped lanthanum oxybromide: first-principles and experimental study

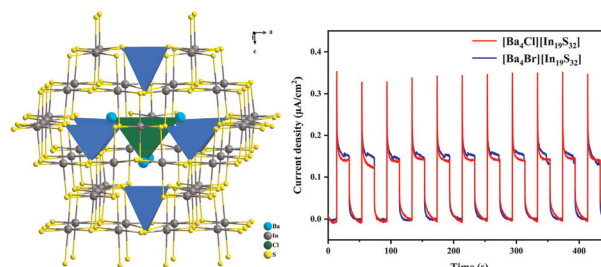
Kazuki Shitara,* Akihide Kuwabara, Naoyoshi Nunotani, Muhammad Radzi Iqbal Bin Misran, Miki Inada, Tomoki Uchiyama, Yoshiharu Uchimoto and Nobuhito Imanaka



14830

[Ba₄X][In₁₉S₃₂] (X = Cl, Br): two quaternary metal chalcogenides exhibiting remarkable photocurrent responses

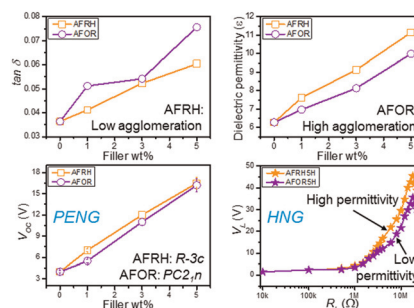
Chunlan Tang, Wenhao Xing, Fei Liang, Jian Tang, Jieyun Wu,* Wenlong Yin* and Bin Kang



14837

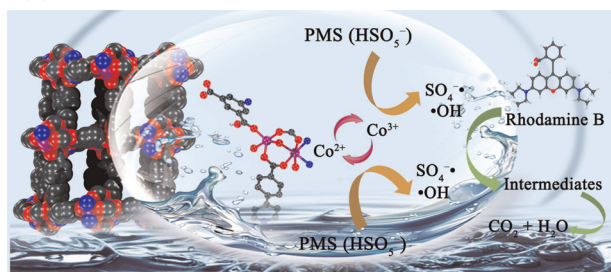
Electroactive properties and piezo-tribo hybrid energy harvesting performances of PVDF-AlFeO₃ composites: role of crystal symmetry and agglomeration of fillers

Abhishek Sasmal, Sourav Maity, A. Arockiarajan and Shrabane Sen*



PAPERS

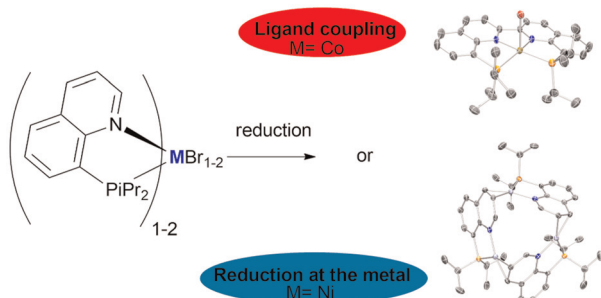
14852



Co-based MOF heterogeneous catalyst for the efficient degradation of organic dye via peroxymonosulfate activation

Wei Xie, Yuan Yuan, Jia-Jun Wang, Shu-Ran Zhang, Guang-Juan Xu, Nan Jiang, Yan-Hong Xu* and Zhong-Min Su*

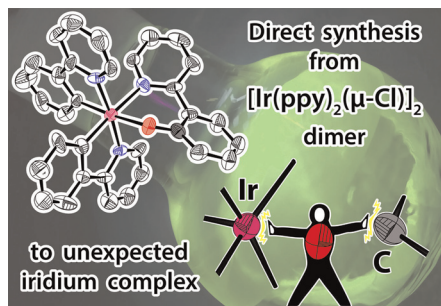
14859



Phosphinoquinoline supported Co^{II}, Ni^{II}, and Fe^{II} complexes: divergent behaviour upon reduction

Pauline Schiltz, Nicolas Casaretto, Sophie Bourcier, Audrey Auffrant* and Corinne Gosmini*

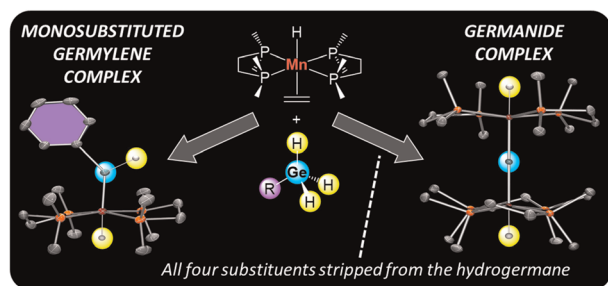
14867



Unexpected reactivity of cyclometalated iridium(III) dimers. Direct synthesis of a mononuclear luminescent complex

Jing Tu, Daniele Veclani, Filippo Monti,* Andrea Mazzanti, Letizia Sambri, Nicola Armaroli and Andrea Baschieri*

14880



Reactions of [(dmpe)₂MnH(C₂H₄)] with hydrogermanes to form germylene, germyl, hydrogermane, and germanide complexes

Jeffrey S. Price, Ignacio Vargas-Baca, David J. H. Emslie* and James F. Britten

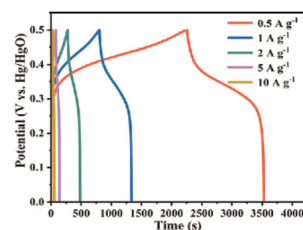
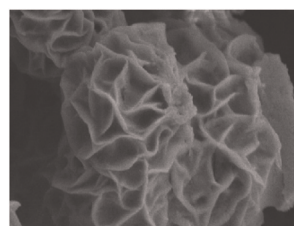


PAPERS

14896

Two birds with one stone: facile fabrication of an iron–cobalt bimetallic sulfide nanosheet-assembled nanosphere for efficient energy storage and hydrogen evolution

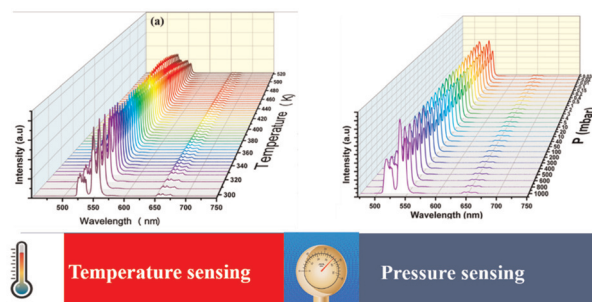
Tong Guo, Dawei Zheng, Guangyu Xu, Yigang Ding and Dong Liu*



14904

Ultralow pressure sensing and luminescence thermometry based on the emissions of Er³⁺/Yb³⁺ codoped Y₂Mo₄O₁₅ phosphors

Kamel Saidi,* Christian Hernández-Álvarez, Marcin Runowski,* Mohamed Dammak and Inocencio R. Martín



Temperature sensing

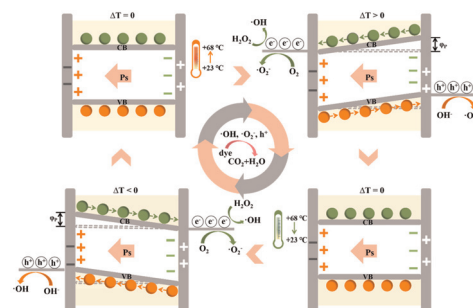


Pressure sensing

14917

Pyroelectric catalytic performance of Sm³⁺-modified Pb(Mg_{1/3}Nb_{2/3})O₃–PbTiO₃ for organic dyes: degradation efficiency, kinetics and pyroelectric catalytic mechanism

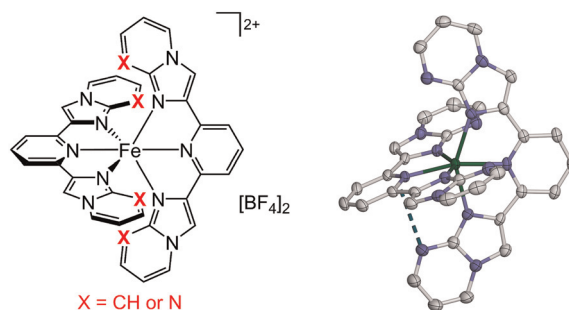
Xinyi Lin, Jina Ding,* Xiaohua Li, Zhuo Tang, Hongbing Chen, Huan Dong, Anhua Wu and Linwen Jiang*



14928

Iron(II) complexes of 2,6-bis(imidazo[1,2-a]pyridin-2-yl)pyridine and related ligands with annelated distal heterocyclic donors

Rafal Kulmaczewski and Malcolm A. Halcrow*

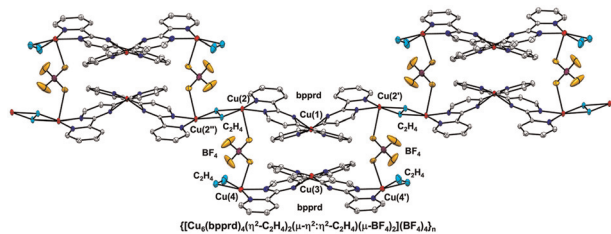


X = CH or N



PAPERS

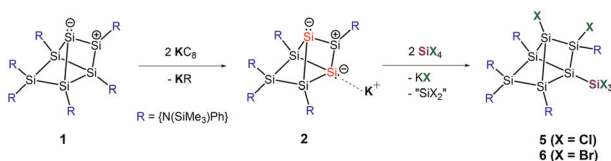
14941



Structural diversity of copper(II)–ethylene complexes with 2,4-bis(2-pyridyl)pyrimidine directed by anions

Masahiko Maekawa,* Terumasa Hayashi, Kuniyoshi Sugimoto, Takashi Okubo and Takayoshi Kuroda-Sowa

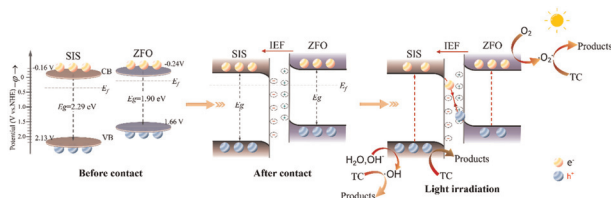
14949



Synthesis and functionalization of the six-vertex anionic amido-substituted silicon cluster $[\text{Si}_6\{\text{N}(\text{SiMe}_3)\text{Ph}\}_5]^-$

Joschua Helmer, Alexander Hepp, Raphael J. F. Berger and Felicitas Lips*[†]

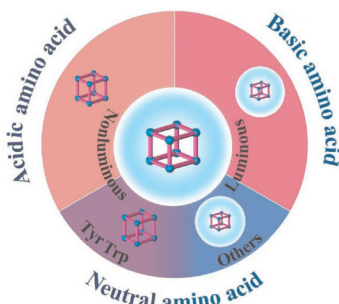
14956



A novel $\text{SnIn}_4\text{S}_8/\text{ZnFe}_2\text{O}_4$ S-scheme heterojunction with excellent magnetic properties and photocatalytic degradation activity for tetracycline

Dafeng Zhang,* Ruiqi Zhang, Xue Jiang, Dong Zhang, Hengshuai Li, Junchang Liu, Xipeng Pu* and Peiqing Cai

14967



Differential fluorescent response to amino acids based on metal–organic framework Zn-PBC

Wenxin Lin,* Yijia Wang, Haoke Zhang, Kei Hoi Shan, Panpan Si, Shijiang Yu, Zhen Wang, Dian Zhao, Junkuo Gao, Minghua Wu and Ben Zhong Tang*

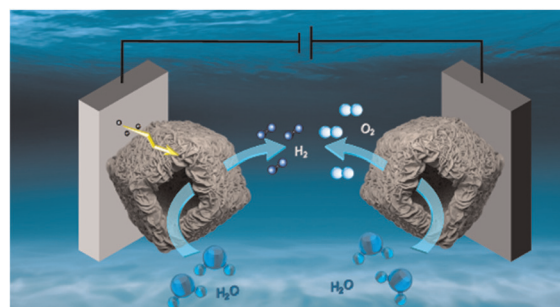


PAPERS

14973

ZIF template-based Fe-doped defect-rich hierarchical structure $\text{Co}_3\text{S}_4/\text{MoS}_2$ as a bifunctional electrocatalyst for overall water splitting

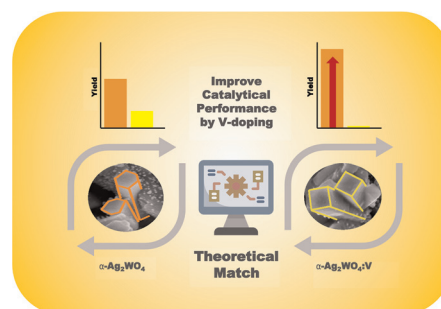
Xiangyu Zhang, Hong Li, Yanhui Li, Xianhui Wang, Hongbin Wang, Wenrong Yang, Jingquan Liu* and Da Li*



14982

Tuning the morphology to enhance the catalytic activity of $\alpha\text{-Ag}_2\text{WO}_4$ through V-doping

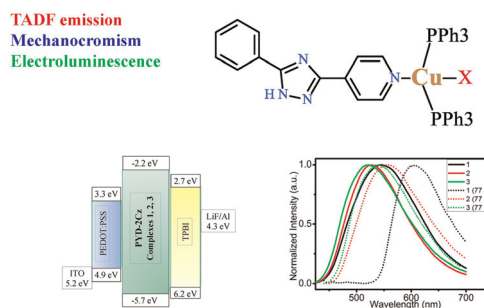
Katiana Lima Patrocínio, Jeziel Rodrigues Santos, Luis Ignacio Granone, Miguel Adolfo Ponce, Maria Sandra Churio, Lara Kelly Ribeiro, Marcio Daldin Teodoro, Rosa Llusar, Juan Andrés, Elson Longo and Marcelo Assis*



14995

Mononuclear copper(I) complexes bearing a 3-phenyl-5-(pyridin-4-yl)-1,2,4-triazole ligand: synthesis, crystal structure, TADF-luminescence, and mechanochromic effects

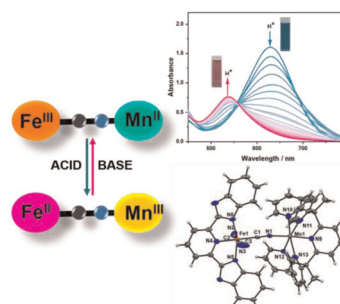
Alexey Gusev,* Elena Braga, Ekaterina Zamnius, Mikhail Kiskin, Amjad Ali, Glib Baryshnikov* and Wolfgang Linert*



15009

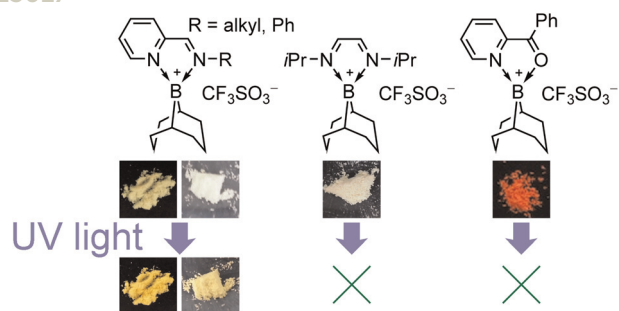
Observation of protonation-induced intra-molecular metal-to-metal charge transfer in cyano-bridged [Fe–CN–Mn/Ni] dinuclear complexes

Shuwen Jia, Xinrui Zhu and Dongfeng Li*



PAPERS

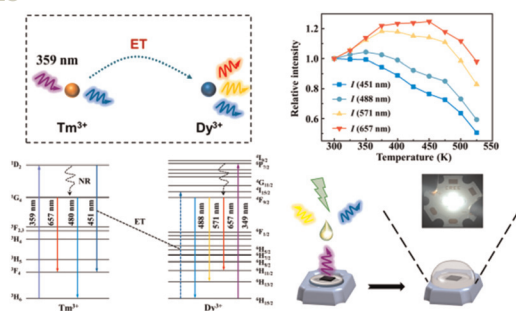
15017



Synthesis, structures, and solid-state photoresponsive color change behavior of boronium complexes bearing a pyridine-imine, diimine, or pyridine-ketone bidentate ligand

Junro Yoshino,* Yoshito Hirono, Ayako Kaneda and Naoto Hayashi

15023

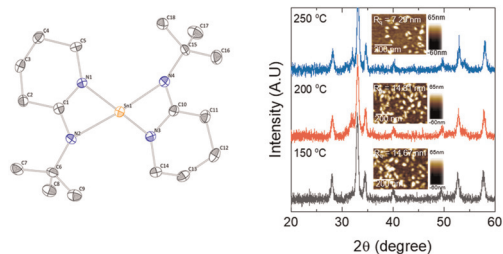


Color-tunable luminescence based on the efficient energy transfer of a Tm–Dy system for optical thermometry and white LED lighting

Qi Xiao, Xingyu Wu, Na Zhou, Zhi Li, Yuqi Liu, Xinyao Dong, Xiumei Yin and Xixian Luo*

15033

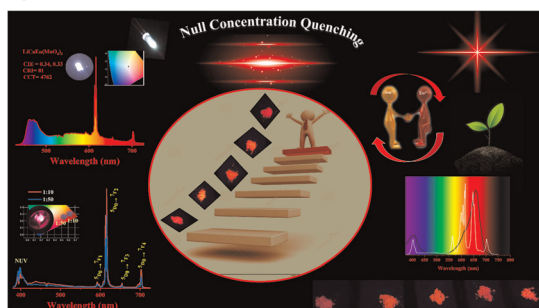
ALD of Tin Nitride



Evaluation of tin nitride (Sn₃N₄) via atomic layer deposition using novel volatile Sn precursors

Hyeonbin Park, Heenang Choi, Sunyoung Shin, Bo Keun Park, Kibum Kang, Ji Yeon Ryu,* Taeyong Eom* and Taek-Mo Chung*

15043



Narrow-band dazzling red-emitting (LiCaLa(MoO₄)₃:Eu³⁺) phosphor with scheelite structure for hybrid white LEDs and LiCaLa(MoO₄)₃:Sm³⁺,Eu³⁺-based deep-red LEDs for plant growth applications

Priyansha Sharma, Jaya Prakash Mada* and Sivakumar Vaidyanathan*

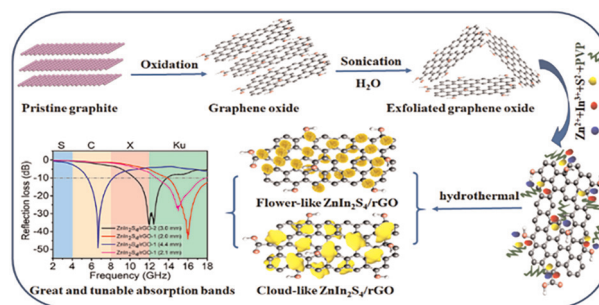


PAPERS

15057

Microstructure optimization strategy of $\text{ZnIn}_2\text{S}_4/\text{rGO}$ composites toward enhanced and tunable electromagnetic wave absorption properties

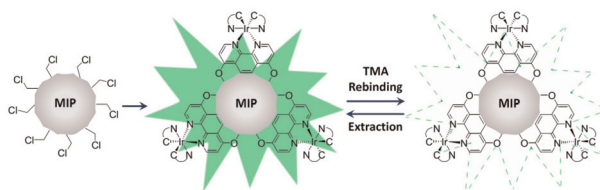
Ran Xu, Man He,* Shuangjiang Feng, Yanmei Liu, Chunfeng Mao, Yongjuan Wang, Xiaohai Bu, Meiyun Zhang and Yuming Zhou*



15071

An Ir(III) cyclometalate-functionalized molecularly imprinted polymer: photophysics, photochemistry and chemosensory applications

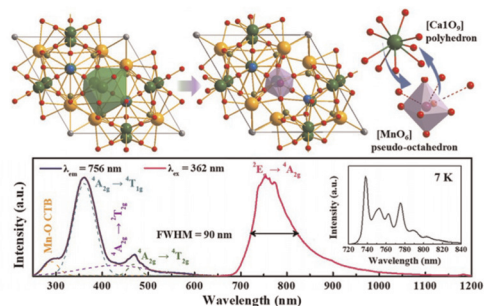
Ruoyang Liu, Shun-Cheung Cheng, Chi-On Ng, Yelan Xiao, Kin-Man Tang, Ka-Ming Tong, Ngai-Yu Lei and Chi-Chiu Ko*



15078

A novel broadband $\text{Ba}_3\text{Ca}_4(\text{BO}_3)_3(\text{SiO}_4)\text{Cl}:\text{Mn}^{4+}$ near-infrared phosphor with a special pseudo-octahedral Mn^{4+} coordination structure

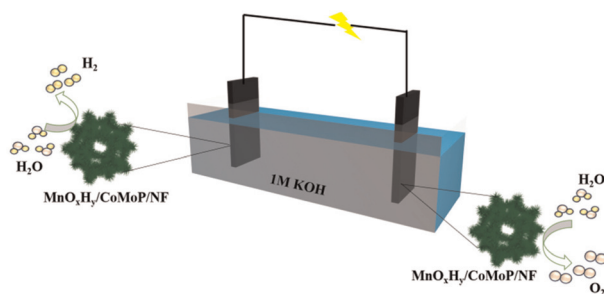
Jiutian Wang, Tao Tan, Ran Pang, Da Li, Chengyu Li, Su Zhang,* Lihong Jiang* and Hongjie Zhang



15091

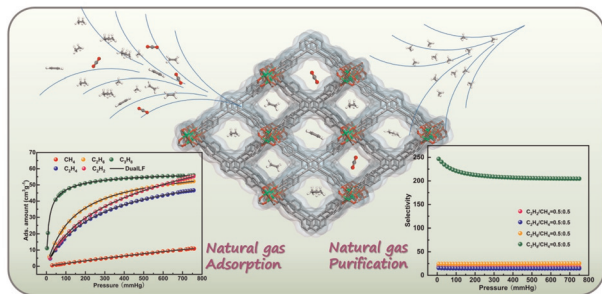
MnO_xH_y -modified CoMoP/NF nanosheet arrays as hydrogen evolution reaction and oxygen evolution reaction bifunctional catalysts under alkaline conditions

Xuemin Wang, Ke Zhang, Yuhan Xie, Dehua Yu, Haoze Tian and Yongbing Lou*



PAPERS

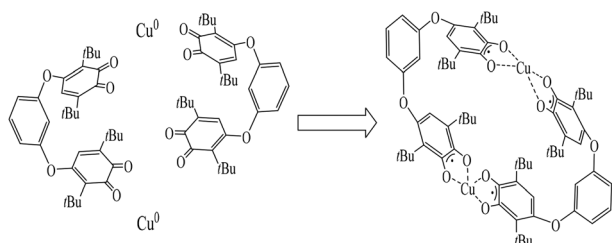
15101



An ethynyl-modified interpenetrated metal–organic framework for highly efficient selective gas adsorption

Xueyue Yu, Ziyang Huang, Rajamani Krishna, Xiaolong Luo* and Yunling Liu*

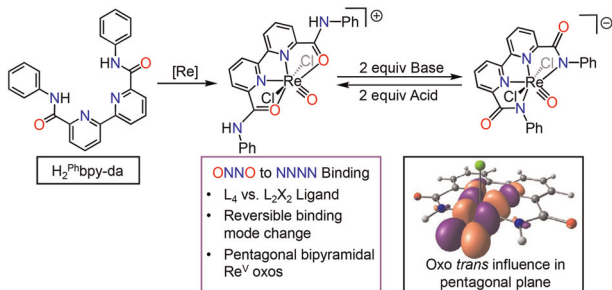
15107



Self-assembly of a metal–organic cage-like structure bearing cofacial redox-active bis-(o-semiquinone) copper(II) units

Anna V. Cherkasova, Anton V. Cherkasov, Konstantin A. Martyanov, Artem S. Bogomyakov, Victor N. Khrustalev, Alexander A. Kissel, Konstantin A. Kozhanov, Viacheslav A. Kuropatov* and Vladimir K. Cherkasov

15115



Synthesis and bonding analysis of pentagonal bipyramidal rhenium carboxamide oxo complexes

Noah D. McMillion, Quinton J. Bruch, Chun-Hsing Chen, Faraj Hasanayn* and Alexander J. M. Miller*

15124



Four-coordinate iron(II) complexes with *trans*- and *cis*- configuration

Four- and three-coordinate planar iron(II) complexes supported by bulky organosilyl ligands

Reon Ishii, Minesato Nakagawa, Yoshimasa Wada and Yusuke Sunada*



CORRECTIONS

15131

Correction: Synthesis and characterization of heterometallic rings templated through alkylammonium or imidazolium cations

Rajeh Alotaibi, Amy Booth, Edmund Little, Adam Brookfield, Amritroop Achari, Selena J. Lockyer, Grigore A. Timco, George F. S. Whitehead, Iñigo J. Vitórica-Yrezábal, Nicholas F. Chilton, Rahul R. Nair, David Collison* and Richard E. P. Winpenny*

15132

Correction: Optical property trends in a family of $\{Mo_6I_8\}$ aquahydroxo complexes

Margarita V. Marchuk, Natalya A. Vorotnikova, Yuri A. Vorotnikov,* Natalia V. Kuratieva, Dmitri V. Stass and Michael A. Shestopalov

