

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(31) 10623–10990 (2023)



Cover

See Davide Barreca,
Gloria Tabacchi *et al.*,
pp. 10677–10688.

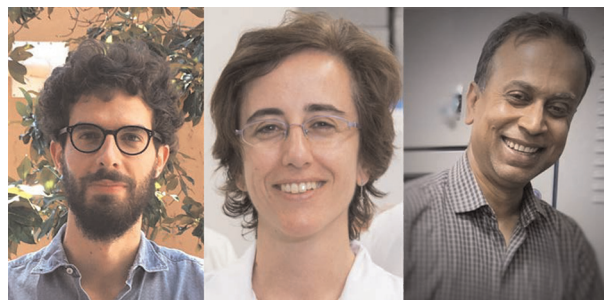
Image reproduced by
permission of Davide Barreca
from *Dalton Trans.*,
2023, **52**, 10677.

EDITORIAL

10637

Aggregation induced luminescence of metal complexes: advances and applications

Andrea Fermi,* Paola Ceroni and
Inamur Rahaman Laskar

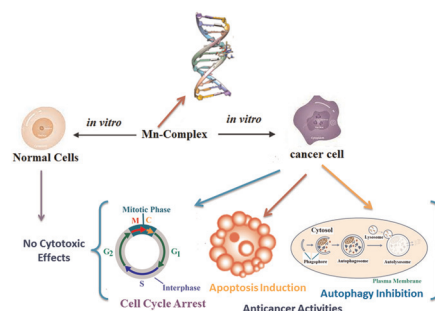


PERSPECTIVE

10639

Interactions of Mn complexes with DNA: the relevance of therapeutic applications towards cancer treatment

Oishi Mallick Ganguly* and Shuvojit Moulik*



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

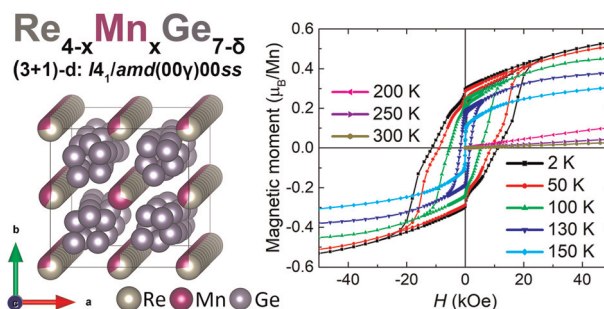


COMMUNICATIONS

10657

Itinerant ferromagnet $\text{Re}_{4-x}\text{Mn}_x\text{Ge}_{7-\delta}$ ($x = 0.9-1.5$, $\delta = 0.42-0.44$) with incommensurate chimney-ladder structure stabilised at ambient pressure

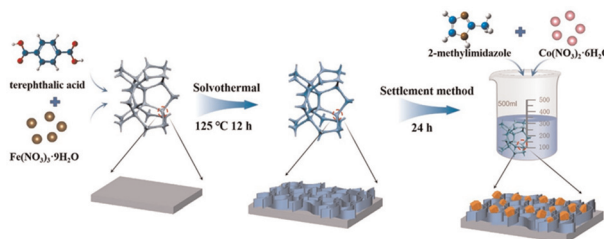
Roman A. Khalaniya,* Valeriy Yu. Verchenko, Alexey V. Bogach, Maxim Likhanov and Andrei V. Shevelkov



10662

Constructing MIL-53(Fe)@ZIF-67(Co) binary metal-organic framework hierarchical heterostructure electrodes for efficient oxygen evolution

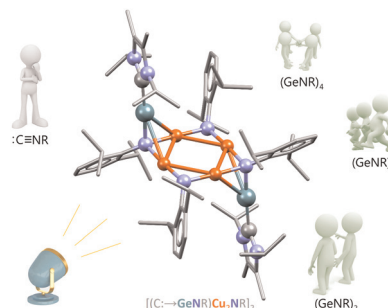
Dan Wen, Yan Ma, Guomei Mu, Qiuping Huang, Xuefeng Luo, Dunmin Lin, Chenggang Xu, Fengyu Xie,* Guangzhao Wang* and Wenhan Guo*



10672

Interaction of germanium analogue of organic isonitrile with Cu(I) imide in side-on mode

Shuai-Cong Huo, Yao Li, Peng-Fei Ji, De-Xiang Zhang, Ying Yang* and Herbert W. Roesky*

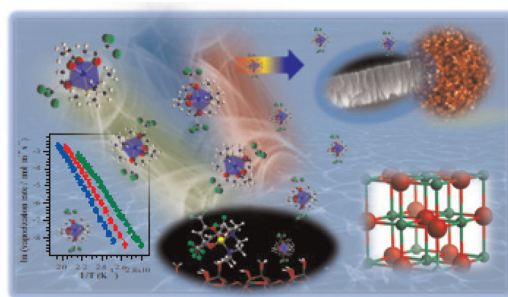


PAPERS

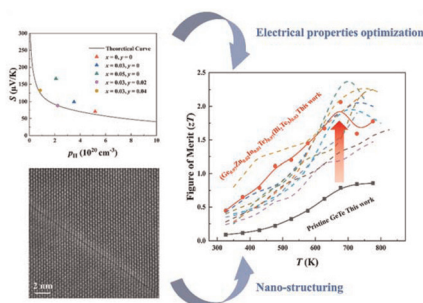
10677

Interplay between coordination sphere engineering and properties of nickel diketonate-diamine complexes as vapor phase precursors for the growth of NiO thin films

M. Benedet, D. Barreca,* E. Fois, R. Seraglia, G. Tabacchi,* M. Roverso, G. Pagot, C. Invernizzi, A. Gasparotto, A. A. Heidecker, A. Pöthig, E. Callone, S. Dirè, S. Bogialli, V. Di Noto and C. Maccato



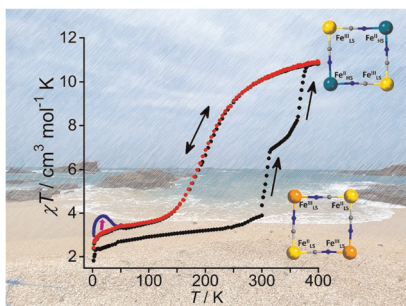
10689



Optimized electronic properties and nano-structural features for securing high thermoelectric performance in doped GeTe

Zan Yang, Yu-Chih Tseng, Suneesh Meledath Valiyaveetil, Hui Yuan, Evan Smith, Kuei-Hsien Chen, Yuyang Huang, Tianze Zou, Jan Kycia and Yuriy Mozharivskiy*

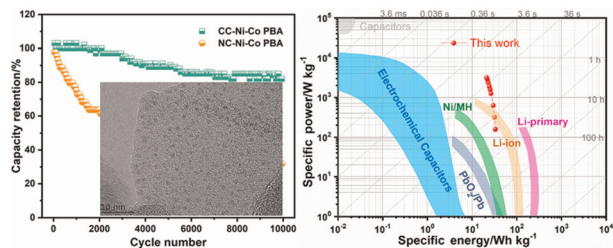
10700



Near room temperature stepwise spin state switching and photomagnetic effect in a mixed-valence molecular square

Sujit Kamilya, Sakshi Mehta, Rodrigue Lescouëzec, Yanling Li, Jiri Pechousek, Mohini Semwal and Abhishake Mondal*

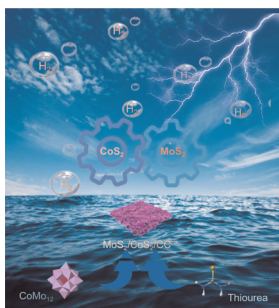
10708



Nickel hexacyanocobaltate quantum dots embedded in N-doped carbon for aqueous alkaline batteries with ultrahigh durability

Yanhong Li,* Zhiting Song, Qifeng Zhang, Kai Shu, Hongming Hu, Yi Lu, Xiao Tang, Xianju Zhou, Xijun Wei and Yunhuai Zhang*

10718



In situ coupling of a Co–Mo bimetallic sulfide derived from $[\text{CoMo}_{12}\text{O}_{40}]^{6-}$ clusters showing highly efficient electrocatalytic hydrogen evolution

Qingfang Zhen, Haijun Pang,* Sumin Hu, Zhongxin Jin, Qiong Wu, Huiyuan Ma,* Xinming Wang, Guixin Yang and Zhipeng Yu*

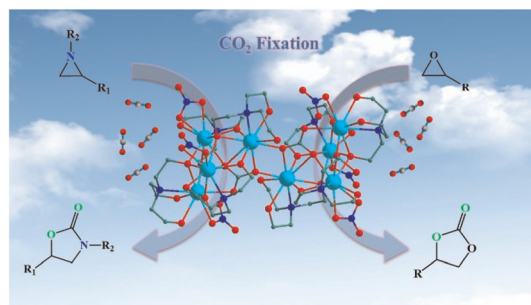


PAPERS

10725

Two novel Ln₈ clusters bridged by CO₃²⁻ effectively convert CO₂ into oxazolidinones and cyclic carbonates

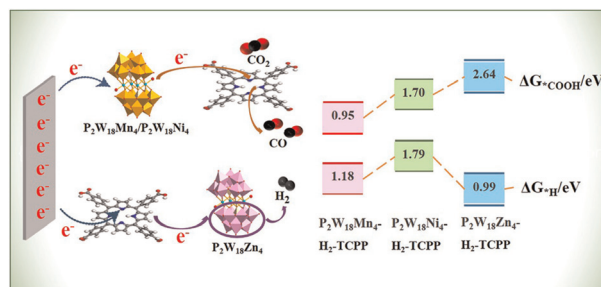
Na Qiao, Xiao-Yan Xin, Wen-Min Wang,* Zhi-Lei Wu* and Jian-Zhong Cui



10737

Exploring the role of sandwich-type polyoxometalates in {K₁₀(PW₉O₃₄)₂M₄(H₂O)₂} @PCN-222 (M = Mn, Ni, Zn) for electroreduction of CO₂ to CO

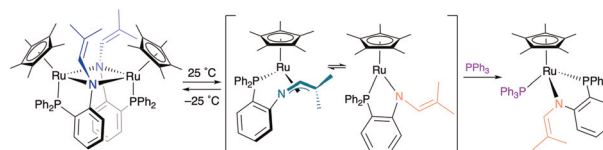
Meng-Ting Peng, Chuang Chen, Yan Zhang, Jia-Yu Xu, Yun-Lei Teng* and Bao-Xia Dong*



10744

Operationally unsaturated ruthenium complex stabilized by a phosphine 1-azaallyl ligand

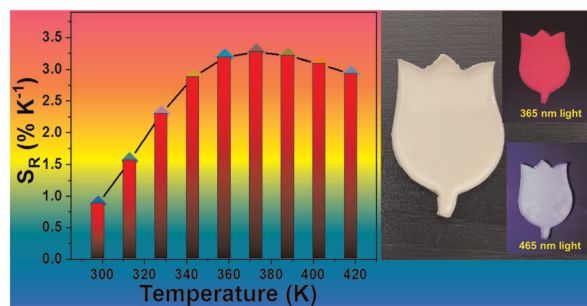
Meagan B. Kindervater, Viktor N. Staroverov, Kyle M. K. Jackman, Amanda A. Fogh, Leslie S. G. Kelley, Lisabeth Lim, Sofia A. Sirohey, Paul D. Boyle and Johanna M. Blacquiere*



10751

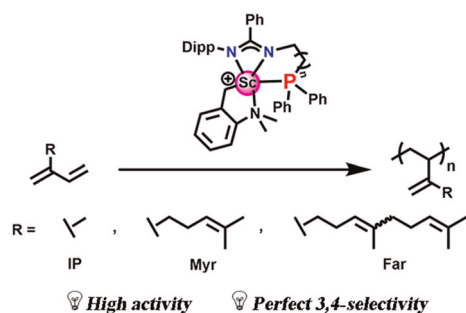
Deep-red-emitting phosphors of Mn⁴⁺-activated tantalite for high-sensitivity lifetime thermometry and security films

Yongbin Hua and Jae Su Yu*



PAPERS

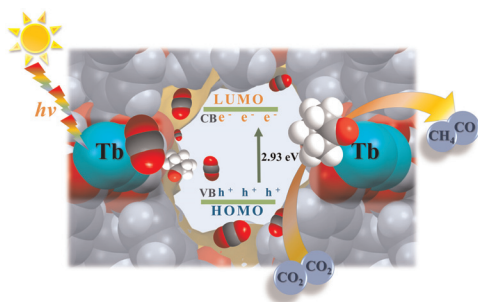
10760



Phosphine-functionalized amidinate ligated rare-earth metal complexes for highly 3,4-selective living polymerization of 1,3-conjugated dienes

Fen You, Jixing Wang, Hui Liu, Xiaohui Kang* and Xiaochao Shi*

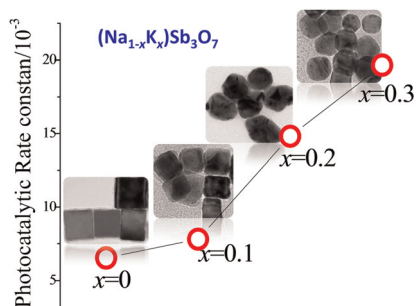
10769



A solvent-responsive terbium-organic framework for photocatalytic CO₂ reduction

Xin Lu, Zhilong Yao, Xiaomin Yuan, Yao Wei, Zhihao Zhu,* Hegen Zheng* and Chuanlei Zhang*

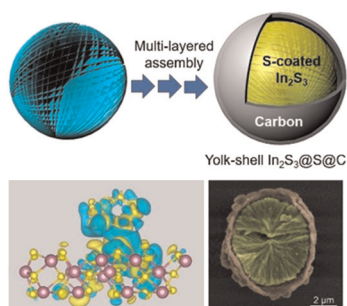
10778



Significant effects of mixed cations on the morphology and photochemical activities of alkali-metal-antimony (Na,K)Sb₃O₇

Donglei Wei, Xifeng Yang, Yushen Liu, Joo Hyun Kim, Sung Heum Park, Hyo Jin Seo and Bo Ram Lee*

10789



Rational engineering yolk-shell In₂S₃@void@carbon hybrid as polysulfide-absorbable sulfur host for high-performance lithium-sulfur batteries

Yingyi Ding, Zihan Shen, Tianli Han, Jing Xu, Huigang Zhang, Chaoquan Hu* and Jinyun Liu*

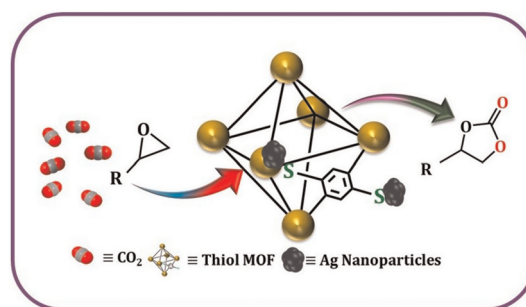


PAPERS

10795

A thiol-containing zirconium MOF functionalized with silver nanoparticles for synergistic CO₂ cycloaddition reactions

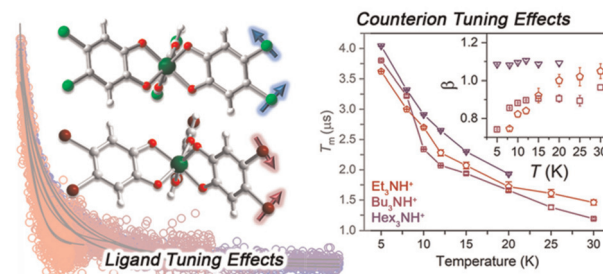
Rajesh Patra and Debajit Sarma*



10805

Impact of ligand chlorination and counterion tuning on high-field spin relaxation in a series of V(IV) complexes

Roxanna Martinez,* Cassidy E. Jackson, Ökten Üngör, Johan van Tol and Joseph M. Zadrozny*

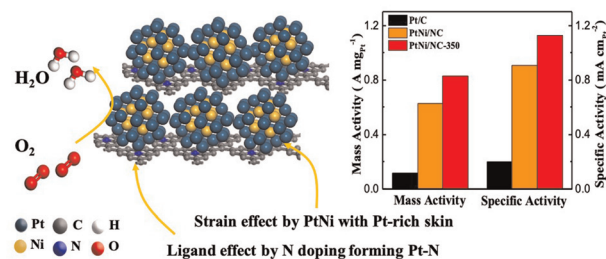


10817

PtNi alloy nanoparticles grown *in situ* on nitrogen doped carbon for the efficient oxygen reduction reaction

Weiqi Ye, Zhenyu Wu, Shengqi Zhang, Yi Sun,* Xiaoyan Zhang,* Wei Zhou,* Weimin Cao, Tao Wang, Danhong Cheng and Haijiao Xie

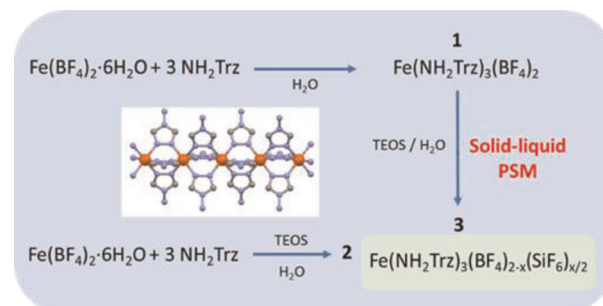
ORR: PtNi/NC catalyst



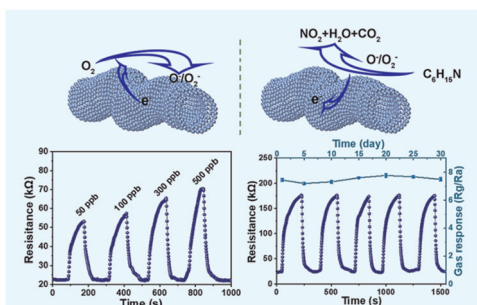
10828

Spin crossover in mixed-anion Fe(NH₂trz)₃(BF₄)(SiF₆)_{0.5} crystalline rod-shaped particles: the strength of the solid-liquid post synthetic modification

Xinyu Yang, Alejandro Enriquez-Cabrera, Dorian Toha, Yannick Coppel, Lionel Salmon* and Azzedine Bousseksou*



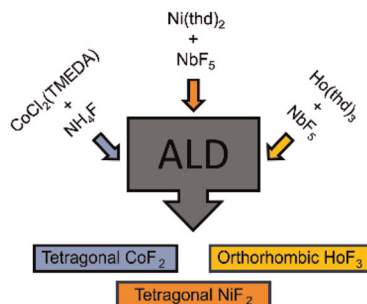
10835



Biotemplate synthesis of a Co_3O_4 microtube sensor for fast triethylamine detection

Tingting Xu, Heru Wang, Jing Zhao,* Fangbo Zhao, Wenbo Cong, Guiling Wang and Junqing Li*

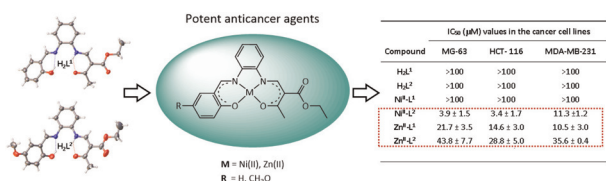
10844



Atomic layer deposition of CoF_2 , NiF_2 and HoF_3 thin films

Elisa Atosuo,* Miia Mäntymäki, Leevi Pesonen, Kenichiro Mizohata, Timo Hatanpää, Markku Leskelä and Mikko Ritala*

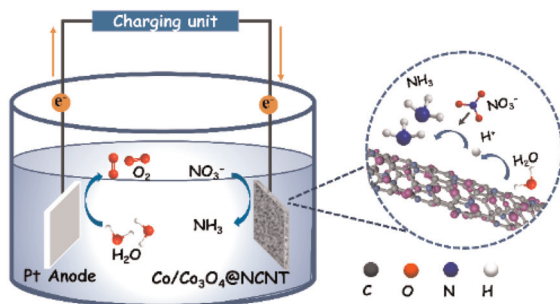
10855



Anticancer activity of Ni(II) and Zn(II) complexes based on new unsymmetrical salophen-type ligands: synthesis, characterization and single-crystal X-ray diffraction

David Villaman,* Andrés Vega, Lucía Santa María de la Parra, Ignacio E. León, Pedro Levín and Patricia M. Toro*

10869



Heterostructured $\text{Co}/\text{Co}_3\text{O}_4$ anchored on N-doped carbon nanotubes as a highly efficient electrocatalyst for nitrate reduction to ammonia

Xianxian He, Hongfei Liu, Jiangzhou Qin, Zhaodong Niu, Jincheng Mu and Baojun Liu*

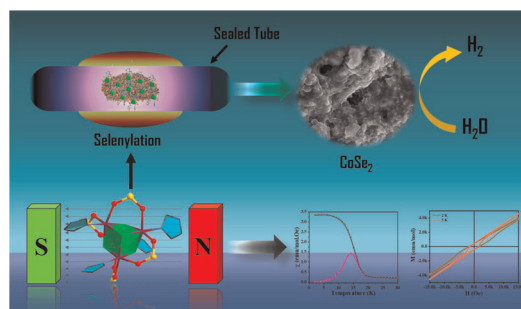


PAPERS

10876

Structure and magnetic properties of an amine-templated one-dimensional cobalt-fluoro-sulfate containing Co_4F_4 cubane and hydrogen evolution reaction (HER) performance of its derived carbon-wrapped CoSe_2 nanorods

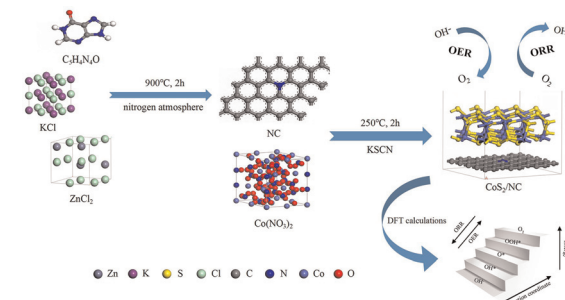
Malaya K. Sahoo and J. N. Behera*



10885

Low-temperature molten salt synthesis and catalytic mechanism of CoS_2/NC as an advanced bifunctional electrocatalyst

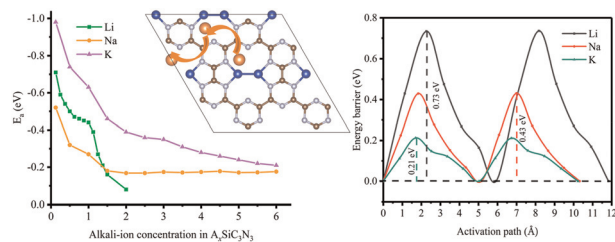
Yuankun Tu, Chuanhua Li,* Yubao Shi, Yu Jiang, Wei Xiao, Shenghua Zhu, Peng Lv and Xuemin Yan*



10895

SiC_3N_3 monolayer as a universal anode for alkali metal-ion batteries

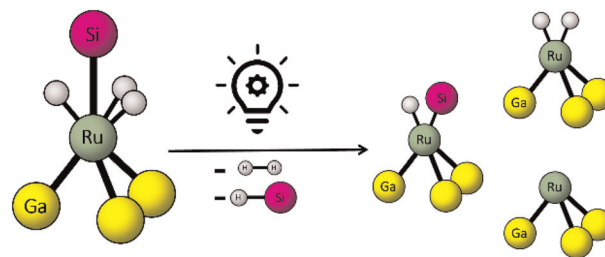
Xiaoying Xia, Jianze Wu, Xu Cai, Bao Liu, Zhaoxin Wang, Yongfan Zhang and Shuping Huang*



10905

Photochemically generated reactive sites at ruthenium/gallium complexes: catalysis vs. cluster growth

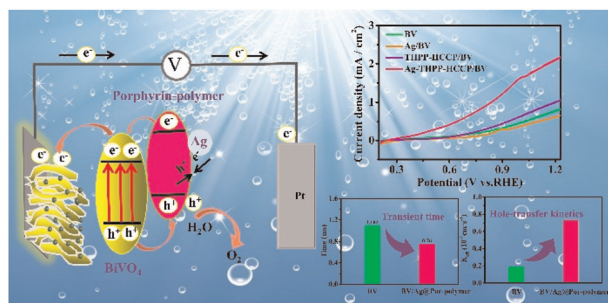
Raphael Bühler, Maximilian Muhr, Johannes Stephan, Robert A. Wolf, Max Schütz, Christian Gemel and Roland A. Fischer*



Catalysis • Cluster Growth • Intermediate Trapping



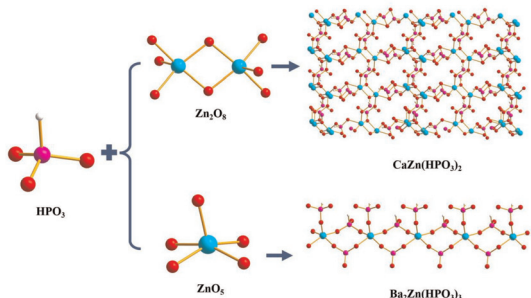
10911



Photogenerated charge separation at BiVO_4 photoanodes enhanced by a Ag-modified porphyrin polymer skeleton

Huiqin Ye, Hui Xiao, Rongfang Zhang, Shengya Zhang, Ze Wang, Wei Luo, Ruixiu Xie, Yanjun Feng and Xiaoquan Lu*

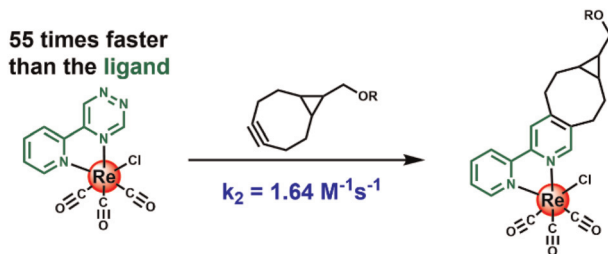
10918



$\text{CaZn}(\text{HPO}_3)_2$ and $\text{Ba}_2\text{Zn}(\text{HPO}_3)_3$: novel alkaline-earth zincophosphites with diversified anionic frameworks

Yu Zhang, Xia Liu, Qian-Yan Liu, Jian-Hua Wang, Ting Hu,* Yan-Mei Lin and Jian-Han Zhang*

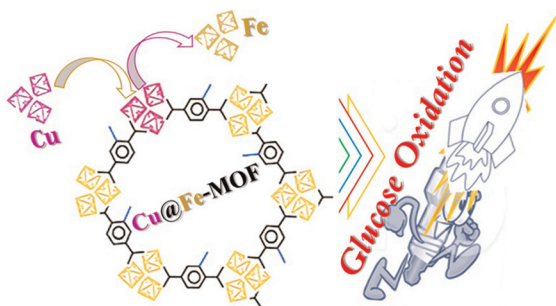
10927



Catching up with tetrazines: coordination of $\text{Re}(\text{I})$ to 1,2,4-triazine facilitates an inverse electron demand Diels–Alder reaction with strained alkynes to a greater extent than in corresponding 1,2,4,5-tetrazines

Mark Sims, Sotiris Kyriakou, Aidan Matthews, Michael E. Deary and Valery N. Kozhevnikov*

10933



Accelerating glucose electrolysis on Cu-doped MIL-88B for an energy efficient anodic reaction in water splitting

Nabeen K. Shrestha,* Supriya A. Patil, Amol S. Salunke, Akbar I. Inamdar and Hyunsik Im*

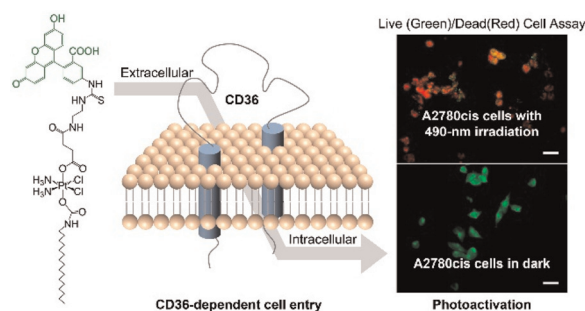


PAPERS

10942

Visible light-activatable platinum(IV) prodrugs harnessing CD36 for ovarian cancer therapy

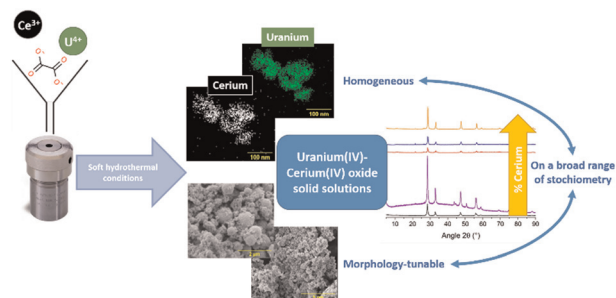
Amarasooriya M. D. S. Jayawardhana, Srijana Bhandari, Ariela W. Kaspi-Kaneti, Man Kshetri, Zihan Qiu, May Cheline, Hao Shen, Barry D. Dunietz and Yao-Rong Zheng*



10951

Hydrothermal conversion of mixed uranium(IV)–cerium(III) oxalates into $U_{1-x}Ce_xO_{2+\delta} \cdot nH_2O$ solid solutions

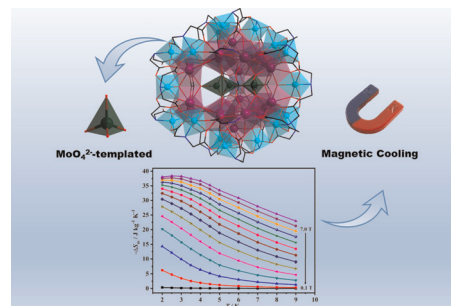
S. Benarib, N. Dacheux, X. F. Le Goff, J. Lautru, L. Di Mascio and N. Clavier*



10969

 MoO_4^{2-} -templated $Ln_{20}Ni_{21}$ heterometallic clusters with large low-field magnetic entropy

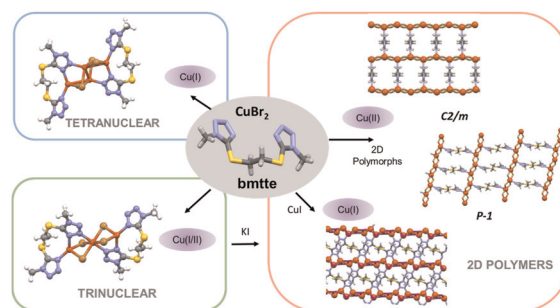
Ya-Ting Yu, Xu Bai, Qin Wang, Ji-Lei Wang, Xin-Ying Xiang, Jiu-Lin Zhou, Si-Man Li and Yan Xu*



10975

From Cu(I) and Cu(I)–Cu(II) mixed-valence clusters to 2D Cu(II) and Cu(I) coordination polymers supported by a flexible bis-tetrazole organosulfur ligand

Olaya Gómez-Paz, Rosa Carballo,* Ana B. Lago,* Inmaculada Prieto and Ezequiel M. Vázquez-López



CORRECTION

10987

Correction: Catalytic exploration of NHC–Ag(I)HMDS complexes for the hydroboration and hydrosilylation of carbonyl compounds

Claudia P. Giarrusso, Daniel Van Zeil and Victoria L. Blair*

