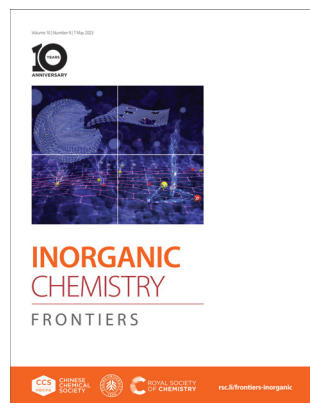


### IN THIS ISSUE

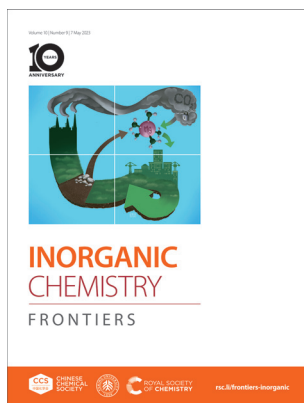
ISSN 2052-1553 CODEN ICFNAW 10(9) 2497–2830 (2023)



#### Cover

See Yan Meng, Dan Xiao et al., pp. 2574–2585.

Image reproduced by permission of Qian Zhao from *Inorg. Chem. Front.*, 2023, **10**, 2574.



#### Inside cover

See Hellen S. Santos et al., pp. 2507–2546.

Image reproduced by permission of Jasmiini Tornberg from *Inorg. Chem. Front.*, 2023, **10**, 2507.

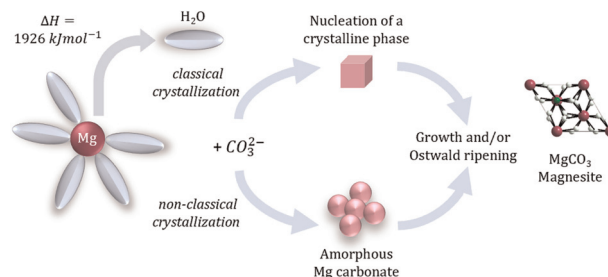
Artwork designed by Jasmiini Tornberg.

### REVIEWS

2507

#### Mechanisms of Mg carbonates precipitation and implications for CO<sub>2</sub> capture and utilization/storage

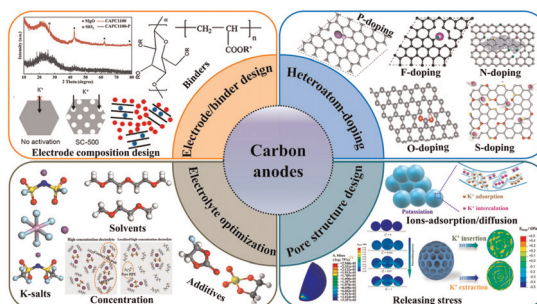
Hellen S. Santos,\* Hoang Nguyen, Fabricio Venâncio, Durgaprasad Ramteke, Ron Zevenhoven and Paivo Kinnunen



2547

#### A comprehensive review of carbon anode materials for potassium-ion batteries based on specific optimization strategies

Fei Yuan, Yanan Li, Di Zhang, Zhaojin Li, Huan Wang, Bo Wang,\* Yusheng Wu\* and Yimin A. Wu\*



## EDITORIAL STAFF

## Executive Editor

Wenjun Liu

## Deputy Editor

Kailin Deng

## Development Editor

Cheng Du

## Editorial Production Manager

Helen Saxton

## Senior Publishing Editor

Becky Webb

## Publishing Editors

Kirstine Anderson, Matthew Bown, Laura Cooper, Hannah Fielding, Clare Fitzgerald, Anoushka Handa, Claire Harding, Alan Holder, Charlie Palmer, Rosie Rethwell, Donna Smith, Laura Smith

## Assistant Editors

Jie Gao, Yu Zhang

## Publisher

Jeanne Andres

For queries about submitted papers, please contact Helen Saxton, Editorial Production Manager, in the first instance. E-mail: [InorgChemFrontiersPROD@rsc.org](mailto:InorgChemFrontiersPROD@rsc.org)

For pre-submission queries please contact Wenjun Liu, Executive Editor. Email: [InorgChemFrontiersED@rsc.org](mailto:InorgChemFrontiersED@rsc.org)

Inorganic Chemistry Frontiers (electronic: ISSN 2052-1553) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WE.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to RSC Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WE, UK Tel +44 (0)1223 432398; E-mail [orders@rsc.org](mailto:orders@rsc.org)

2023 Annual (electronic) subscription price: £2,182; US\$3,492. 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](http://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](mailto:advertising@rsc.org)

For marketing opportunities relating to this journal, contact [marketing@rsc.org](mailto:marketing@rsc.org)

# INORGANIC CHEMISTRY

## FRONTIERS

An international, high quality journal for interdisciplinary research between inorganic chemistry and related subjects.



CHINESE  
CHEMICAL  
SOCIETY



[rsc.li/frontiers-inorganic](http://rsc.li/frontiers-inorganic)

Published in collaboration with the Chinese Chemical Society and College of Chemistry and Molecular Engineering, Peking University

## Editorial Board

## Editor-in-Chief

Song Gao, Peking University, Sun Yat-sen University, China

## Associate Editors

Jun Chen, Nankai University, China  
Paula Diaconescu, University of California, Los Angeles, USA  
Svetlana Mintova, Université de Caen, France  
Justin J. Wilson, Cornell University, USA  
Teppei Yamada, The University of Tokyo, Japan  
Zhiping Zheng, Southern University of Science and Technology, China

## Members

Hiroshi Kitagawa, Kyoto University, Japan  
Yu Tang, Lanzhou University, China  
Xianran Xing, University of Science and Technology Beijing, China  
Nanfeng Zheng, Xiamen University, China

## Advisory Board

Christopher J. Chang, University of California, Berkeley, USA  
Chi-Ming Che, University of Hong Kong, China  
Ling Chen, Beijing Normal University, China  
Xiaoming Chen, Sun Yat-Sen University, China  
Eugenio Coronado, University of Valencia, Spain  
Yi Cui, Stanford University, USA  
Patrick Gámez, University of Barcelona, Spain  
Hairong Guan, University of Cincinnati, USA  
Andy Hor, University of Hong Kong, China  
Zhaomin Hou, RIKEN, Japan  
Xile Hu, École Polytechnique Fédérale de Lausanne, Switzerland  
Mercouri Kanatzidis, Northwestern University,

USA  
Jaqueline L. Kiplinger, Los Alamos National Laboratory, USA  
Yadong Li, Tsinghua University, China  
Wenbin Lin, University of Chicago, USA  
Yi Lu, University of Texas at Austin, USA  
P. S. Mukherjee, Indian Institute of Science, India  
Wonwoo Nam, Ewha Womans University, Korea  
Hiroshi Nishihara, University of Tokyo, Japan  
Hiroki Oshio, University of Tsukuba, Japan  
Oleg Ozerov, Texas A&M University, USA  
Manfred Scheer, University of Regensburg, Germany

Baolian Su, University of Namur, Belgium  
Jean Pascal Sutter, Laboratory of Coordination Chemistry, CNRS, France  
Richard Winpenny, University of Manchester, UK  
Yi Xie, University of Science and Technology of China, China  
Zuwei Xie, The Chinese University of Hong Kong, China  
Chunhua Yan, Peking University, China  
Hong-Cai Joe Zhou, Texas A&M University, USA  
Xiaodong Zou, Stockholm University, Sweden  
Qichun Zhang, City University of Hong Kong, China

## Information for Authors

Full details on how to submit material for publication in Inorganic Chemistry Frontiers 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/frontiers-inorganic](http://rsc.li/frontiers-inorganic)

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 Partner Organisations 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

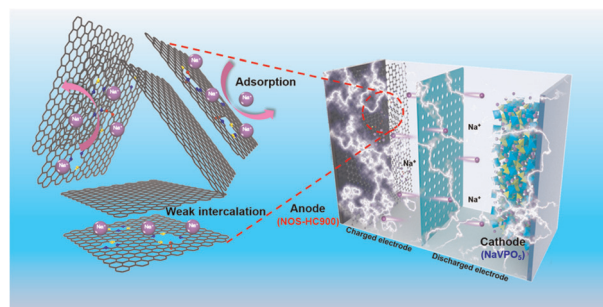


## RESEARCH ARTICLES

2574

### Nitrogen/oxygen/sulfur tri-doped hard carbon nanospheres derived from waste tires with high sodium and potassium anodic performances

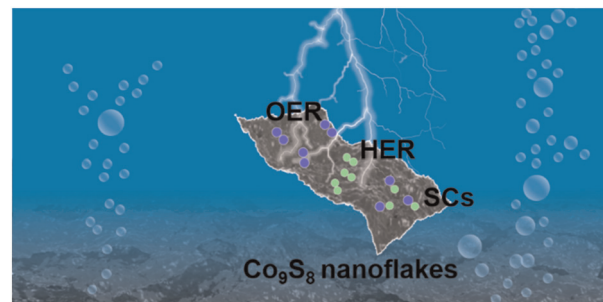
Qian Zhao, Qiaotian Zheng, Shenghu Li, Bin He, Xiulong Wu, Yujue Wang, Qingyuan Wang, Yan Meng\* and Dan Xiao\*



2586

### Synthesis of $\text{Co}_9\text{S}_8$ nanoflakes by a one-step solvent-free solid-state method for multiple electrocatalytic reactions

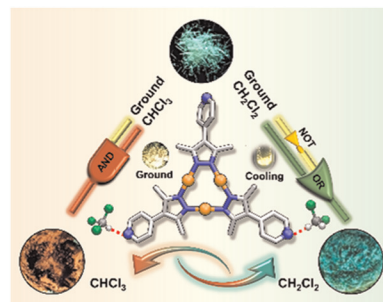
Peifeng Yu, Lingyong Zeng, Kuan Li, Chao Zhang, Kangwang Wang, Longfu Li, Ying Liang, Kai Yan and Huixia Luo\*



2594

### Multistimuli-responsive behavior of a phosphorescent $\text{Cu}_3\text{pyrazolate}_3$ complex for luminescent logic gates and encrypted information transformation

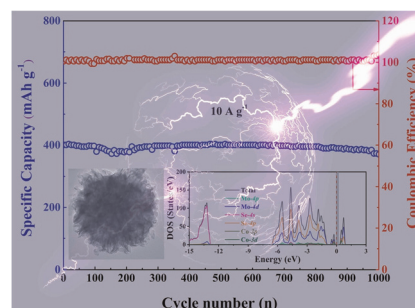
Wen-Jing Tang, Hu Yang, Su-Kao Peng, Ze-Miao Xiao, Guo-Quan Huang, Ji Zheng\* and Dan Li\*



2607

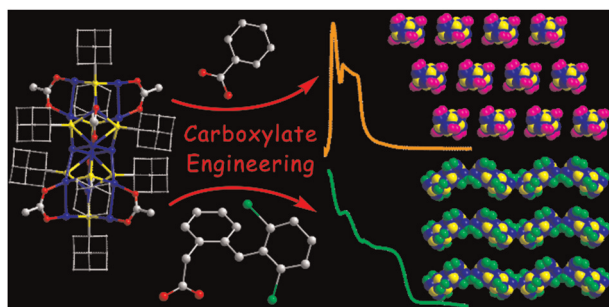
### Electronic structure manipulation of $\text{MoSe}_2$ nanosheets with fast reaction kinetics toward long-life sodium-ion half/full batteries

Lei Zhang, Huilong Dong, Chengkui Lv, Chencheng Sun, Huaixin Wei, Xiaowei Miao, Jun Yang,\* Liang Cao\* and Hongbo Geng\*



## RESEARCH ARTICLES

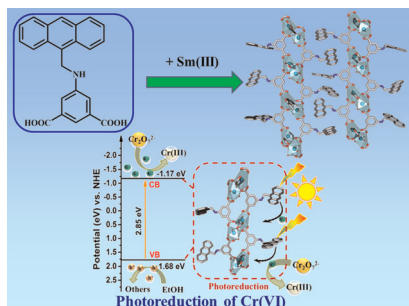
2618



### Carboxylate engineering for manipulating the optical and assembly properties of copper clusters

Jing Sun, Fang Sun, Jiaqi Tang, Xiongkai Tang, Qingyuan Wu, Rong Huo, Ayisha He, Sachurilatu, Xueli Sun, Chaolumen,\* Qing Tang\* and Hui Shen\*

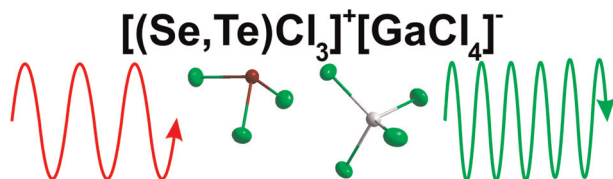
2626



### Introducing anthracene and amino groups into Ln-OFs for the photoreduction of Cr(VI) without additional photosensitizers or cocatalysts

Wenxiao Guo, Shufang Wang, Hongguo Hao,\* Xiangjin Kong, Hui Yan, Hongjie Zhu, Yunwu Li, Huawei Zhou, Dichang Zhong\* and Fangna Dai

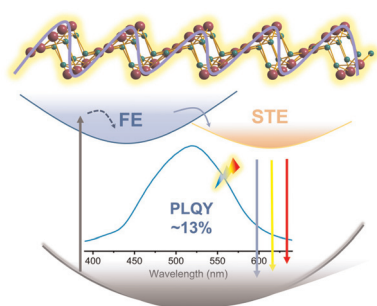
2636



### Second-harmonic-generation of [(Se,Te)Cl<sub>3</sub>]<sup>+</sup>[GaCl<sub>4</sub>]<sup>-</sup> with aligned ionic tetrahedra

Maxime A. Bonnin, Lkhamsuren Bayarjargal, Victor Milman, Björn Winkler\* and Claus Feldmann\*

2645



### Stable self-trapped broadband emission from an organolead halide coordination polymer with strong layer corrugation and high chemical robustness

Ruonan Xi, Yilin Jiang, Yukong Li, Jinlin Yin and Honghan Fei\*

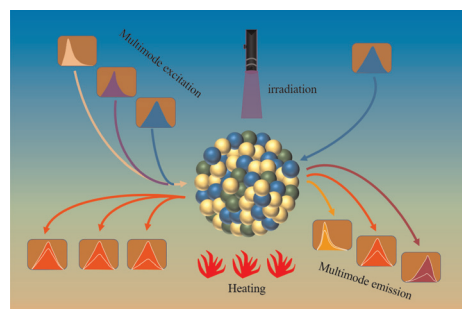


## RESEARCH ARTICLES

2653

### Realization of multiple luminescence manipulation in tungsten bronze oxides based on photochromism toward real-time, reversible, and fast processes

Tong Wei,\* Yongchao Shi, Xiangyu Wang, Yingqiu Xu, Jiao Cui, Liwei Wu, Borui Zhang, Jiawei Wang and Yingdong Han



2665

### Gadolinium-loaded LTL nanosized zeolite for efficient oxygen delivery and magnetic resonance imaging

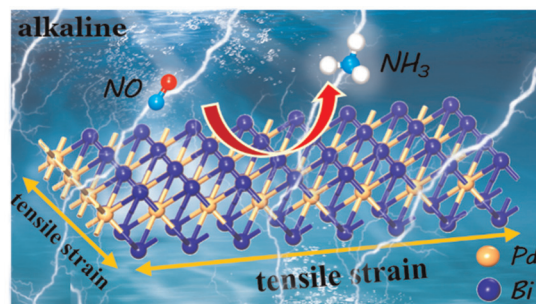
Abdallah Amedlous, Charly Hélaïne, Rémy Guillet-Nicolas, Oleg Lebedev, Samuel Valable\* and Svetlana Mintova\*



2677

### The $\beta$ -PdBi<sub>2</sub> monolayer for efficient electrocatalytic NO reduction to NH<sub>3</sub>: a computational study

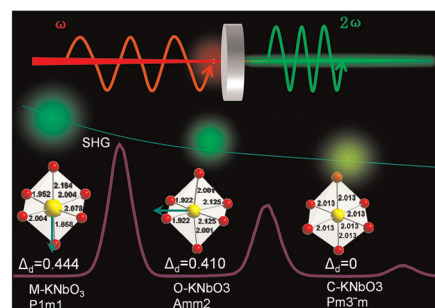
Yuting Sun, Zhongxu Wang, Yuejie Liu,\* Qinghai Cai and Jingxiang Zhao\*



2689

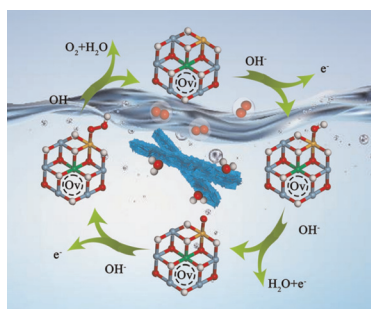
### Insights into the mechanism of the symmetry dependent SHG properties in low dimensional KNbO<sub>3</sub> structures

Tianhui Wu, Baipeng Yin, Zhenpan Bian, Yahui Gao, Jianmin Gu\* and Desong Wang\*



## RESEARCH ARTICLES

2697



### Boosting electrocatalytic water oxidation by vanadium–iron–nickel trimetal hydroxide catalysts through interphase ionic migration method

Wei Zuo, Zhenhang Xu, Mengyu Hu, Yueying Yu, Jinyan Liu, Gongzhen Cheng\* and Pingping Zhao\*

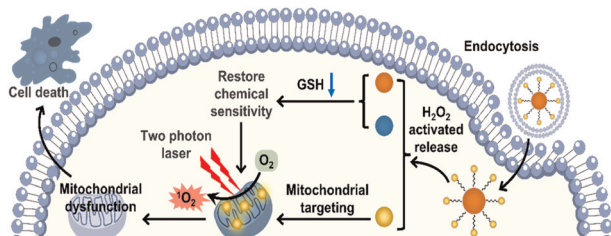
2708



### Atomically isolated and unsaturated Sb sites created on $\text{Sb}_2\text{S}_3$ for highly selective NO electroreduction to $\text{NH}_3$

Kai Chen, Ying Zhang, Wenyu Du, Yali Guo and Ke Chu\*

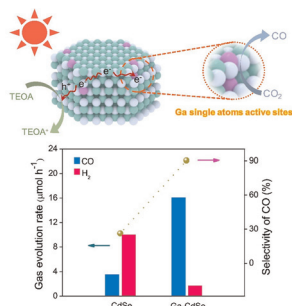
2716



### Cancer cell membrane-camouflaged and $\text{H}_2\text{O}_2$ -activatable nanocomposites for synergistic chemotherapy and two-photon photodynamic therapy against melanoma

Siyuan Gao, Fangmian Wei, Johannes Karges, Yukun Zhao,\* Liangnian Ji and Hui Chao\*

2731



### Efficient and selective photocatalytic $\text{CO}_2$ reduction over Ga single atom decorated quantum dots under visible light

Li Shi,\* Yingkui Yan, Ye Wang, Tingting Bo, Wei Zhou,\* Xiaohui Ren and Yanshuo Li\*

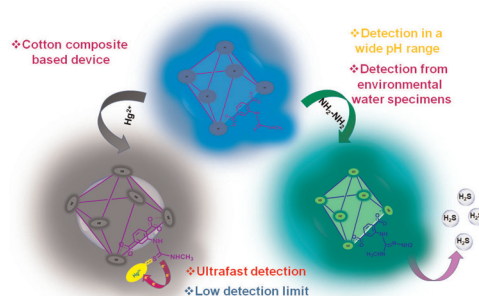


## RESEARCH ARTICLES

2742

### Electrophilicity modulated targeted luminescence of MOF-coated cotton composite for dual analyte detection in aqueous medium

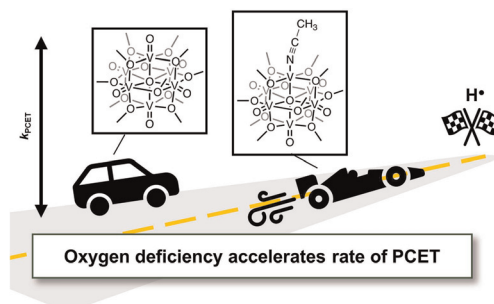
Abhijeet Rana and Shyam Biswas\*



2754

### Accelerated rates of proton coupled electron transfer to oxygen deficient polyoxovanadate–alkoxide clusters

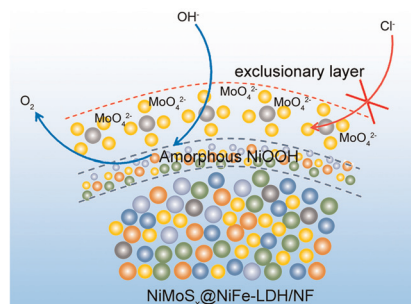
Shannon E. Cooney, Eric Schreiber, William W. Brennessel and Ellen M. Matson\*



2766

### Highly efficient and stable oxygen evolution from seawater enabled by a hierarchical NiMoS<sub>x</sub> microcolumn@NiFe-layered double hydroxide nanosheet array

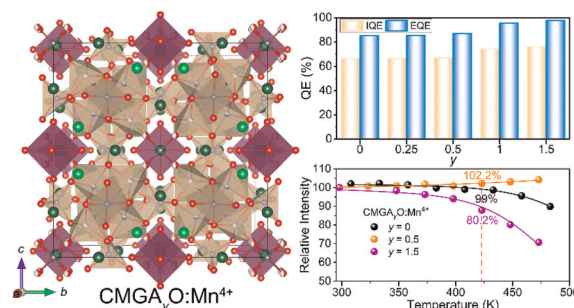
Longcheng Zhang, Ling Li, Jie Liang, Xiaoya Fan, Xun He, Jie Chen, Jun Li, Zixiao Li, Zhengwei Cai, Shengjun Sun, Dongdong Zheng, Yongsong Luo, Hong Yan, Qian Liu, Abdulmohsen Ali Alshehri, Xiaodong Guo,\* Xuping Sun\* and Binwu Ying\*



2776

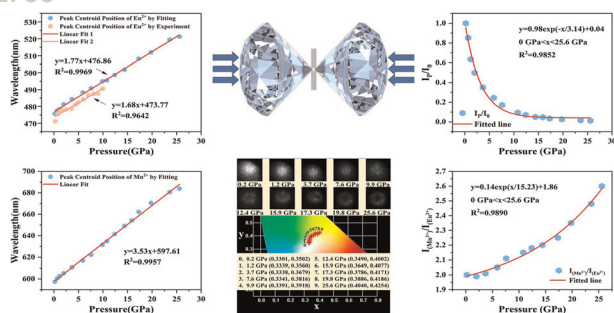
### Structural confinement-induced highly efficient deep-red emission and negative thermal quenching performance in Mn<sup>4+</sup>-activated Ca<sub>7</sub>Mg<sub>2</sub>Ga<sub>6-y</sub>Al<sub>y</sub>O<sub>18</sub>:Mn<sup>4+</sup> phosphors

Jinmei Huang, Pengfei Jiang,\* Zien Cheng, Rong Wang, Rihong Cong and Tao Yang\*



## RESEARCH ARTICLES

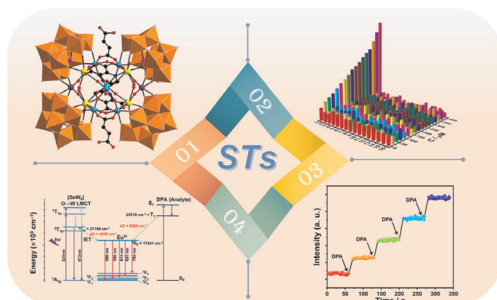
2788



### $\text{Eu}^{2+}$ and $\text{Mn}^{2+}$ co-doped $\text{Lu}_2\text{Mg}_2\text{Al}_2\text{Si}_2\text{O}_{12}$ phosphors for high sensitivity and multi-mode optical pressure sensing

Zhibo Zheng, Yanhua Song, Baofeng Zheng, Yanxia Zhao, Qilin Wang, Xiangting Zhang, Bo Zou\* and Haifeng Zou\*

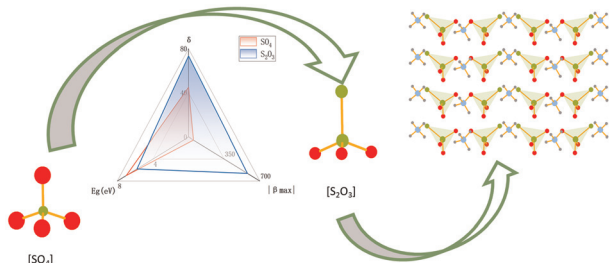
2799



### Dual-ligand-functionalized dodeca-nuclear lanthanide-tungsten-cluster incorporated selenotungstates and fluorescence detection of dipicolinic acid (an anthrax biomarker)

Tiantian Gong, Sen Yang, Zixu Wang, Mengyao Li, Siyu Zhang, Jiancai Liu,\* Lijuan Chen\* and Junwei Zhao\*

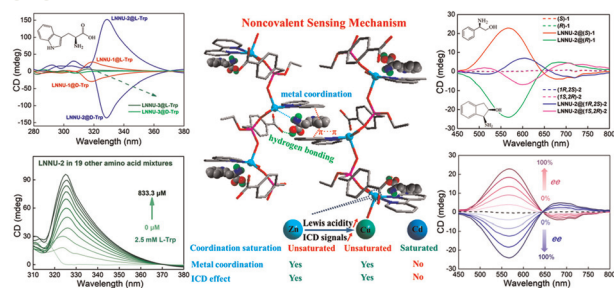
2811



### Constructing ultraviolet nonlinear optical crystals with large second harmonic generation and short absorption edges by using polar tetrahedral $\text{S}_2\text{O}_3$ groups

Shixian Ke, Huixin Fan,\* Chensheng Lin, Ning Ye and Min Luo\*

2818



### Noncovalent induced circular dichroism sensors based on a chiral metal-organic framework: chiral induction synthesis, quantitative enantioselective sensing and noncovalent sensing mechanism

Yanyu Zhu, Tianyang Ding, Xu Zhang, Yanan Zhou, Jiahui Yu, Xin Li, Hanwen Zheng, Zhengang Sun\* and Chengqi Jiao\*

