

Journal of Materials Chemistry C

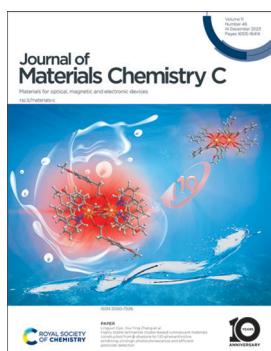
Materials for optical, magnetic and electronic devices

rsc.li/materials-c

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 2050-7526 CODEN JMCCCX 11(46) 16105–16414 (2023)



Cover

See Lingyun Cao,
Xiu-Ying Zheng et al.,
pp. 16125–16134.
Image reproduced
by permission of
Xiu-Ying Zheng and
Mei-Xin Hong from
J. Mater. Chem. C,
2023, 11, 16125.



Inside cover

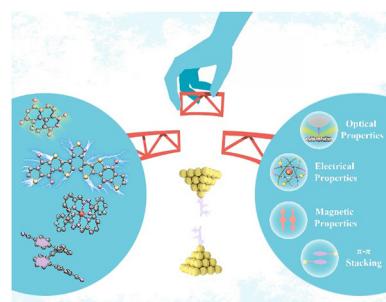
See Huan Zhou, Lei Yang
et al., pp. 16135–16142.
Image reproduced
by permission of
Huan Zhou and
Lei Yang from
J. Mater. Chem. C,
2023, 11, 16135.

PERSPECTIVE

16117

Bridging the gap from single molecule properties to organic semiconductor materials

Qian Zhan, Dacheng Dai, Fang Miao, Dongsheng Wang,*
Xiaodong Liu* and Yonghao Zheng*

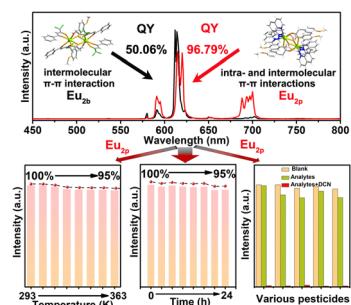


PAPERS

16125

Highly stable lanthanide cluster-based luminescent materials constructed from β -diketone to 1,10-phenanthroline exhibiting ultrahigh photoluminescence and efficient pesticide detection

Mei-Xin Hong, Cheng Chen, Lingyun Cao,* Jun Zheng
and Xiu-Ying Zheng*



Journal of Materials Chemistry C

rsc.li/materials-C

Journal of Materials Chemistry A, B & C cover high quality studies across all fields of materials chemistry. The journals focus on those theoretical or experimental studies that report new understanding, applications, properties and synthesis of materials. *Journal of Materials Chemistry C* covers materials with applications in optical, magnetic and electronic devices.

Editorial Board

Editor-in-Chief

Natalie Stingelin, Georgia Institute of Technology, USA

Associate Editors

A. S. Achalkumar, Indian Institute of Technology, India
Rachel Crespo-Otero, University College London, UK
Renaud Demadrille, Interdisciplinary Research Institute of Grenoble, France
Antonio Facchetti, Georgia Institute of Technology, USA
Unjogn Jeong, POSTECH, South Korea

Oana Jurchescu, Wake Forest University, USA
Mingzhu Li, Chinese Institute of Physics and Chemistry, Chinese Academy of Sciences, China

Martyn McLachlan, Imperial College London, UK
Kasper Moth-Poulsen, Chalmers University of Technology, Sweden
Ana Nogueira, University of Campinas, Brazil
Erin Ratcliff, University of Arizona, USA
Yan Vayzner, Technical University of Dresden, Germany
Maia Vergniory, Max Planck Institute for

Chemical Physics of Solids, Germany
Ni Zhao, Chinese University of Hong Kong, Hong Kong

Zhiguo Xia, South China University of Technology, China
Hao-Li Zhang, Lanzhou University, China

Advisory Board

Z. Bao, Stanford University, USA

L. Biniek, Institut Charles Sadron - Strasbourg, France

H. Bronstein, University of Cambridge, UK

P. Carbone, University of Manchester, UK

J. Casado, University of Malaga, Spain

R. Chandrasekar, University of Hyderabad, India

L. X. Chen, Northwestern University, USA

Y.J. Cheng, National Chiao Tung University, Taiwan

M. Chhowalla, University of Cambridge, UK

C. Chi, National University of Singapore, Singapore

L. Chua, National University of Singapore, Singapore

P. Data, Silesian University of Technology, Poland

O. Dautel, University of Montpellier, France

E. Dias, Durham University, UK

M. Fournigou, University of Rennes, France

G. Frey, MIT WPU Campus, Israel

A. Fukazawa, Kyoto University, Japan

C. F. O. Graeff, UNESP, Brazil

M. Green, King's College London, UK

E. von Hauff, VU Amsterdam, The Netherlands

S. Heuts, Imperial College London, UK

L. Hueso, CIC nanoGUNE, Spain

C. S. Hwang, Seoul National University, South

Korea

M. Jeffries-El, Boston University, USA

A. Köhler, University of Bayreuth, Germany

H. Kuang, Jiangnan University, China

T. Kusamoto, Institute for Molecular Science, Japan

M. Lira-Cantú, Catalan Institute of Nanoscience and Nanotechnology, Spain

M. Loi, University of Groningen, The Netherlands

Y.L. Loo, Princeton University, USA

S. Marder, University of Colorado Boulder, USA

A. Mas-Torrent, Institute of Materials Science of Barcelona, Spain

I. McCulloch, University of Oxford, UK

J. Milić, University of Fribourg, Switzerland

E. Moons, Karlstad University, Sweden

H. Mori, University of Tokyo, Japan

C. Müller, Chalmers University of Technology, Sweden

T.Q. Nguyen, University of California, Santa Barbara, USA

J. Ouyang, National University of Singapore, Singapore

T. Penfold, Newcastle University, UK

I. Perepichka, Institute of Flexible Electronics of Northwestern Polytechnical University, Xi'an, China

C. S. Hwang, Seoul National University, South

C. Risko, University of Kentucky, USA

N. Robertson, University of Edinburgh, UK

A. Salleo, Stanford University, USA

P. Samori, University of Strasbourg, France

C. Santato, Polytechnique Montréal, Canada

A. Sastre-Santos, Miguel Hernández University of Elche, Spain

D. Scanlon, University College London, UK

U. Schwingenschlögl, King Abdullah University of Science and Technology, Saudi Arabia

R. Seshadri, University of California, Santa Barbara, USA

E. Sessoli, University of Florence, Italy

C. Silva, Georgia Institute of Technology, USA

P. Skabar, University of Glasgow, UK

Y. Song, Institute of Chemistry, CAS, China

J. Travas-Sejdic, University of Auckland, New Zealand

A. Troisi, University of Liverpool, UK

K. Vandewal, Hasselt University, Belgium

C. Weder, University of Fribourg, Switzerland

G. Welch, University of Calgary, Canada

W.Y. Wong, The Hong Kong Polytechnic University, China

Y. Yin, University California Riverside, USA

A. Zayats, King's College London, UK

X. Zhan, Peking University, China

Q. Zhang, City University of Hong Kong, Hong Kong

Information for Authors

Full details on how to submit material for publication in *Journal of Materials Chemistry C* 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/materials-c. Submissions: The journal welcomes submissions of manuscripts for publication as Full Papers, Communications, Reviews, Highlights and Applications. Full Papers and Communications should describe original work of high quality and impact which must highlight the novel properties or applications (or potential properties/applications) of the materials studied.

Additional details are available from the Editorial Office or <http://www.rsc.org/authors>

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

Editorial Staff

Executive Editor

Michaela Mühlberg

Deputy Editor

Geraldine Hay

Editorial Production Manager

Jonathon Watson

Senior Publishing Editor

Fiona Iddon

Development Editor

Rose Wedgbury

Publishing Editors

Matthew Blow, Juan Gonzalez, Rob Hinde, Sam Howell, Evie Karkera, Shruti Karnik, Carole Martin, Kirsty McRoberts, Charu Storr-Vijay, Manman Wang, Tom Williams

Editorial Assistant

Daniel Smith

Publishing Assistant

Jane Paterson

Publisher

Sam Keltie

For queries about submitted papers, please contact Jonathon Watson, Editorial Production Manager in the first instance. E-mail: materialsC@rsc.org

For pre-submission queries please contact Michaela Mühlberg, Executive Editor. E-mail: materialsC-rsc@rsc.org

Journal of Materials Chemistry C (electronic: ISSN 2050-7534) is published 48 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 the Royal Society of Chemistry 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

2023 Annual (electronic) subscription price: £2521; \$4046. 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

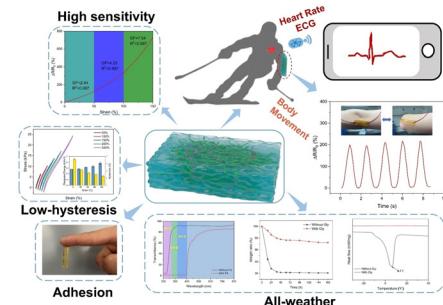


PAPERS

16135

A robust conductive organohydrogel with adhesive and low-hysteresis properties for all-weather human motion and wireless electrocardiogram sensing

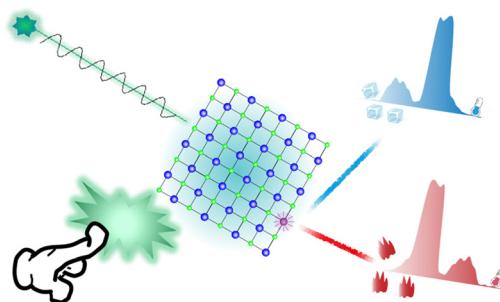
Yuhao Zhao, Qianbin Zhao, Shihao Peng, Huan Zhou* and Lei Yang*



16143

Application convenient and energy-saving mechano-optics of Er^{3+} -doped $\text{X}_2\text{O}_2\text{S}$ ($\text{X} = \text{Y/Lu/Gd}$) for thermometry

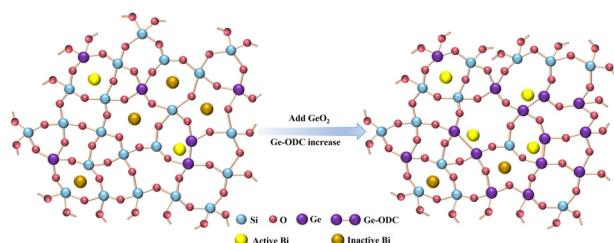
Xixiao Han, Leipeng Li,* Chongyang Cai, Pei Li, Tao Li, Xiumei Han, Dengfeng Peng* and Yanmin Yang*



16152

Broadband L+ near-infrared luminescence in bismuth/germanium co-doped silica glass prepared by the sol-gel method

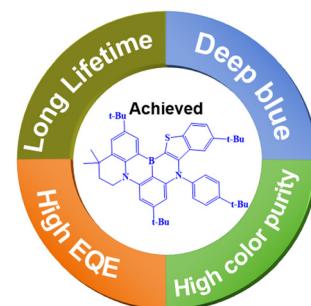
Xin Li, Mengting Guo, Chongyun Shao, Jinming Tian, Fan Wang, Yinggang Chen, Yan Jiao, Chunlei Yu* and Lili Hu*



16159

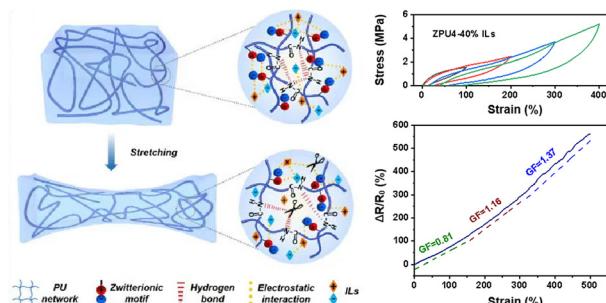
Reducing intersystem crossing rates of boron emitters for high-efficiency and long-lifetime deep-blue OLEDs

Keyan Bai, Mengke Li, Xiaofeng Tan, Lei Dai, Kaichun Liang, Huiyang Li* and Shi-Jian Su*



PAPERS

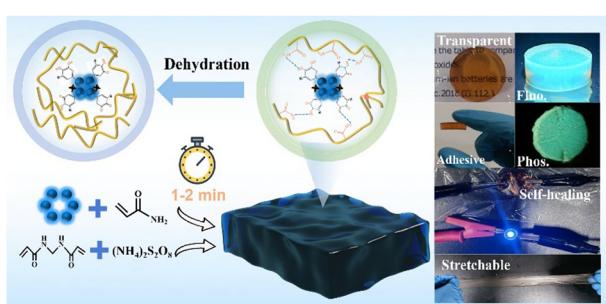
16168



Skin-mimetic tough polyurethane ionogel for use in soft iontronics

Bin Hong, Yiyan Xu, Jun Tan,* Zeming Xie, Si Yu Zheng,* Qi Wang,* Zhijun Zhou and Jintao Yang*

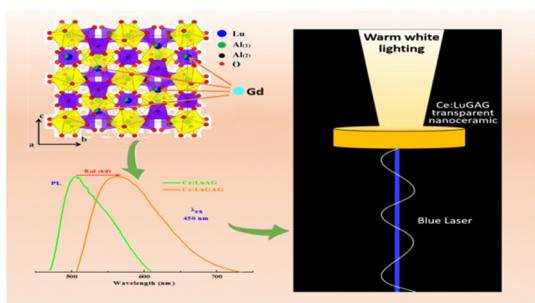
16177



Ultrafast fabrication of lignin carbon dot hydrogels with self-mending properties and dehydration-visualizable phosphorescence for chemical sensing and information encryption

Junyu Chen, Gui Chen, Caijuan Wu, Bingfu Lei, Yingliang Liu and Mingtao Zheng*

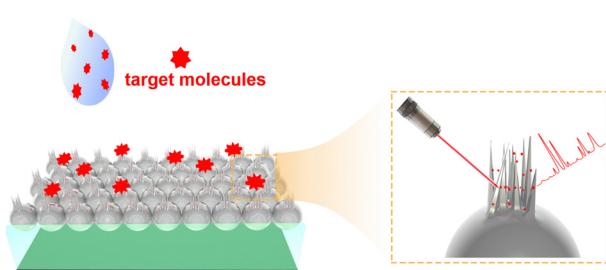
16186



Elaboration of Ce:(Lu,Gd)3Al5O12-Al2O3 transparent nanoceramics through full glass crystallization for high-power white LED/LD lighting

Jie Fu, Ying Zhang, Shaowei Feng, Yongchang Guo, Yafeng Yang, Cécile Genevois, Emmanuel Véron, Hui Wang, Mathieu Allix* and Jianqiang Li*

16195



A high-density Ag nanoneedle forest array by using a nano-peeling technique for near-infrared SERS detection

Zhiming Chen, Pan Zeng, Yifan Wang, Guofeng Zhang, Jie Yu, An Cao, Dilong Liu* and Yue Li*

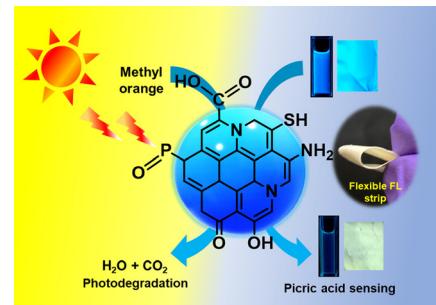


PAPERS

16201

Portable and non-invasive fluorescent thin films from photocatalytically active carbon dots for selective and trace-level detection of picric acid

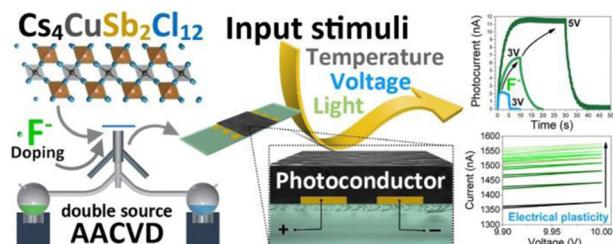
Nirmiti Mate, Divya Khandelwal, Kallayi Nabeela and Shaikh M. Mobin*
Open Access Article. Published on 30 November 2023. Downloaded on 2/22/2026 3:53:01 PM. This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.



16214

All-green $\text{Cs}_4\text{CuSb}_2\text{Cl}_{12}$ perovskite films deposited *in situ* by AACVD and their doping with F^- ions for photodetectors and memdiodes

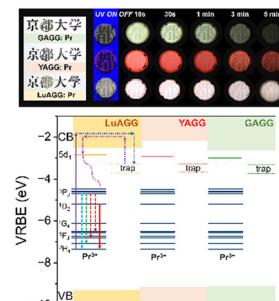
Jesús Uriel Balderas-Aguilar,* Ciro Falcón-Guajardo, Ismael Arturo Garduño-Wilches, Miguel Ángel Aguilar-Frutis, Norberto Hernández-Como, Iván Enrique Martínez-Merlín, Manuel García-Hipólito and Juan Carlos Alonso-Huitrón



16225

Toward color variation of long persistent luminescence in Pr^{3+} -doped garnet transparent ceramic phosphors

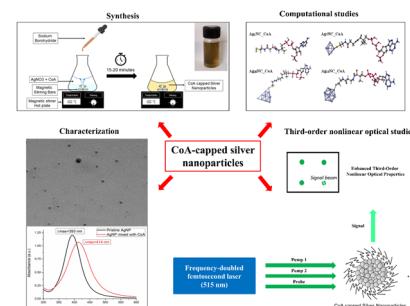
Qiping Du,* Jumpei Ueda* and Setsuhisa Tanabe



16234

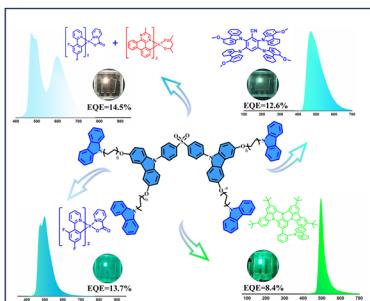
Investigation of enhanced third-order optical nonlinearity in novel coenzyme A capped silver nanoparticles

Aditya Dileep Kurdekar,* Prajal Chettri, Rajasimha Kurnoothala, Chelli Sai Manohar, Shailesh Srivastava and Krishna Chaitanya Vishnubhatla



PAPERS

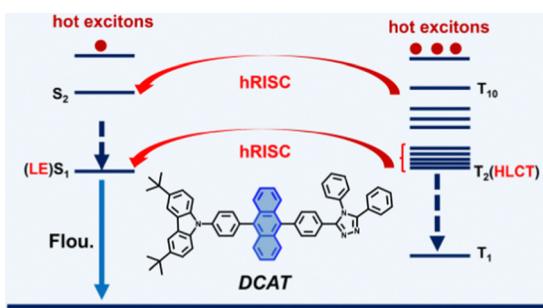
16247



Developing versatile dendrimer host materials for solution-processed phosphorescence, TADF and multi-resonance narrow-band OLEDs

Wenhai Zhang, Jianmin Yu, Qingpeng Cao, Youqiang Qian, Jiayi Wang, Caixia Yang, Hongyu Zhuang, Wenzhong Bian, Yumeng Xin and Xinxin Ban*

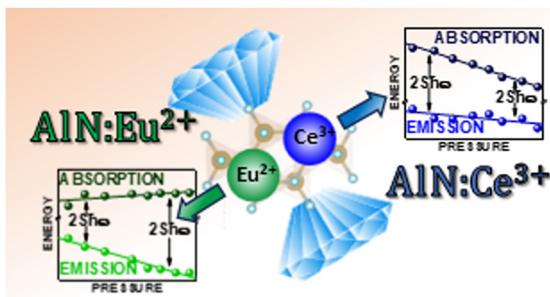
16258



Highly efficient deep-blue organic light-emitting diodes (OLEDs) based on hot-exciton materials with multiple triplet exciton conversion channels

Mizhen Sun, Chenglin Ma, Lizhi Chu, Yuyu Pan, Qikun Sun, Wenjun Yang and Shanfeng Xue*

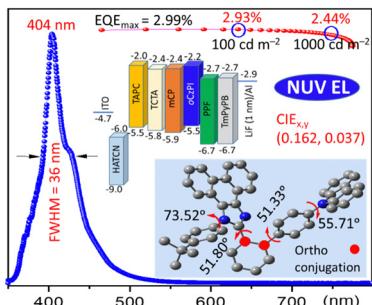
16264



Opposite pressure impact on electron–phonon coupling in Eu²⁺ and Ce³⁺ doped AlN

Mikołaj Kamiński,* Agata Lazarowska, Tadeusz Leśniewski, Ru-Shi Liu and Sebastian Mahlik*

16271



Weak-conjugation linked donor–acceptor emitters for efficient near-ultraviolet organic light-emitting diodes with narrowed full width at half maximum

Ziting Zhong, Zhangshan Liu, Xianhui Wang, Dan Xiong, Huihui Li, Xin Jiang Feng,* Zujin Zhao* and Hua Lu*

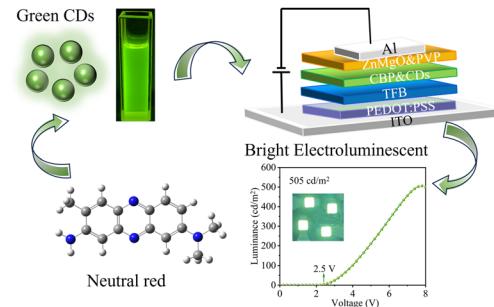


PAPERS

16280

Optimizing charge balance in carbon dot-based LEDs for enhanced performance

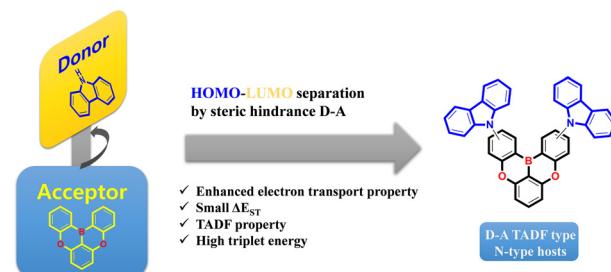
Zhenzhen Yu, Zhenyang Liu,* Mingjun Chen, Jinxing Zhao, Chaoqi Hao, You Zhang, Fenghe Wang, Guoyi Dong, Li Guan* and Xu Li*



16288

Oxygen-bridged boron derivatives as electron transport and thermally activated delayed fluorescence host materials for high-performance phosphorescent organic light-emitting diodes

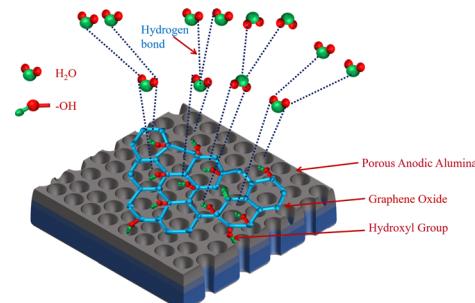
Sook Hee Jeong, Jun Seop Im, Dong Ryun Lee, Han Jin Ahn, Jun Yun Kim, Ji-Ho Baek and Jun Yeob Lee*



16297

A graphene oxide (GO)–porous anodic alumina (PAA) bilayer system: How GO dispersion regulates the lower RH detection limit to near zero in conjugation with PAA

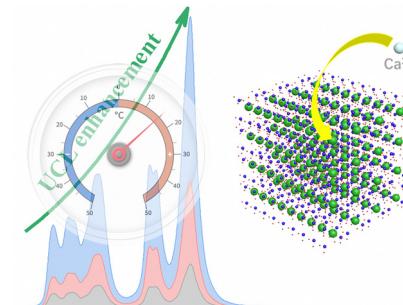
Noor Alam and S. S. Islam*



16310

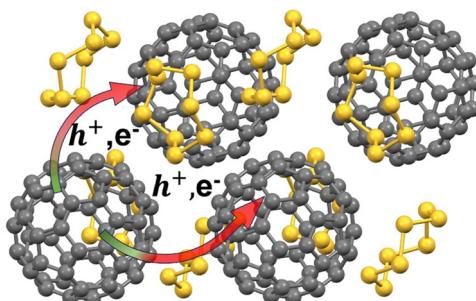
Upconversion enhancement through engineering the local crystal field in Yb³⁺ and Er³⁺ codoped BaWO₄ along with excellent temperature sensing performance

Guotao Xiang,* Zhen Liu, Zhiyu Yang, Yongjie Wang, Lu Yao, Sha Jiang, Xianju Zhou, Li Li, Xiaojun Wang* and Jiahua Zhang*



PAPERS

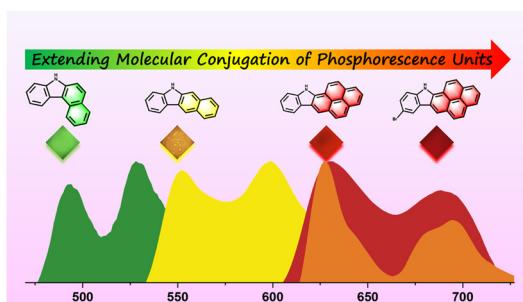
16316



Electronic, vibrational, and optical properties of fullerene-S₈ co-crystals

Maliheh Shaban Tameh, Xiaojuan Ni, Veaceslav Coropceanu* and Jean-Luc Brédas*

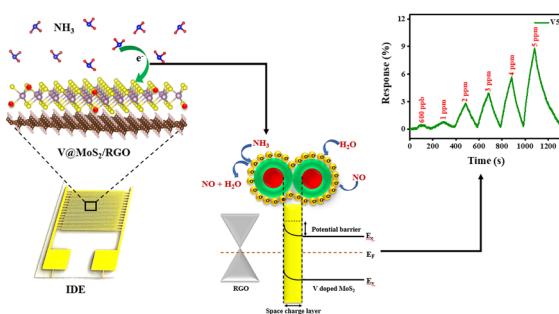
16325



Extending the molecular conjugation of phosphorescence units to accurately modulate ultralong organic room temperature phosphorescence

Jingjuan Bai, Guangkuo Dai, Huiwen Jin, Jiaxin Ma, Zewei Li, Yan Guan, Mingxing Chen, Zhimin Ma and Zhiyong Ma*

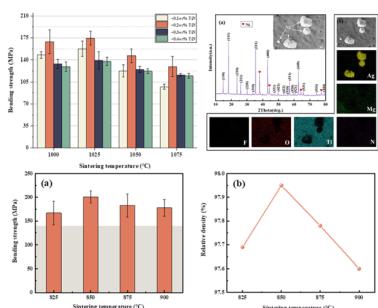
16333



Edge sites enriched vanadium doped MoS₂/RGO composites as highly selective room temperature ammonia gas sensors with ppb level detection

Linto Sibi S P, Rajkumar M,* Kamaraj Govindharaj, Mobika J, Nithya Priya V and Rajendra Kumar Ramasamy Thangavelu

16346



Enhanced flexural strength and microwave dielectric properties of Li₂MgTi₃O₈-based low temperature co-fired ceramics

Haiqing Deng, Xin Qu, Pengxiang Gao, Yang Liu, Weilin Chen, Xiuli Chen and Huanfu Zhou*

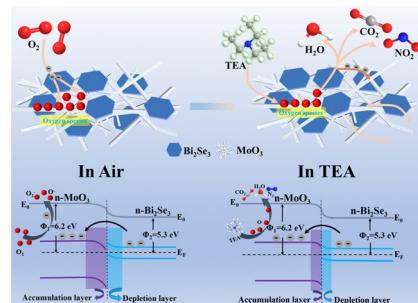


PAPERS

16356

A heterojunction composite of Bi_2Se_3 nanosheets and MoO_3 nanobelts for a high-performance triethylamine sensor

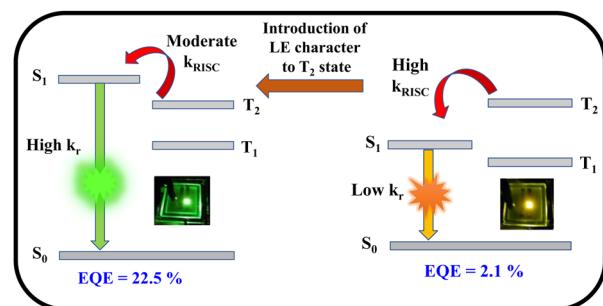
Xiangyun Tan, Li Wang, Xi Chen, Haoliang Zhang, Si Chen, Libing Qian, Zhiyuan Chen and Chunqing He*



16368

Systematic investigation via controlling the energy gap of the local and charge-transfer triplet state for enabling high efficiency thermally activated delayed fluorescence emitters

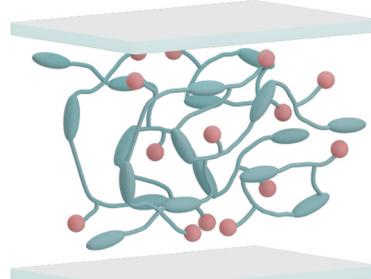
Nisha Yadav, Upasana Deori, Ezhakudiyian Ravindran, Bahadur Sk and Pachaiyappan Rajamalli*



16377

Molecular engineering of the polymer stabilizing network to enhance the electro-optic response of cholesteric liquid crystals

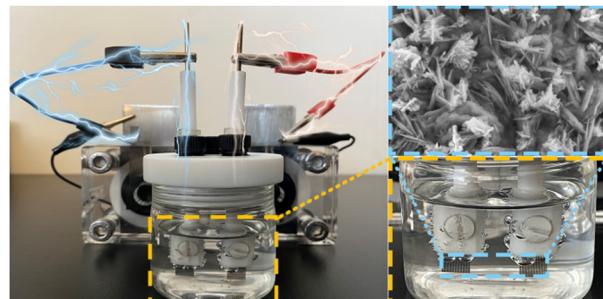
Gaurav K. Pande, Brian P. Radka, Joselle M. McCracken and Timothy J. White*



16384

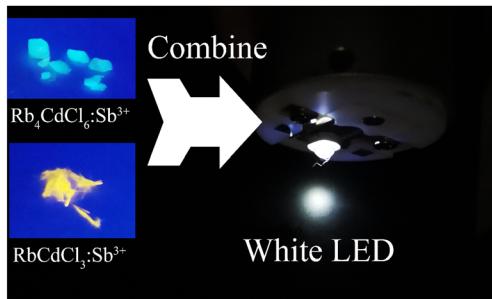
CoNi_2S_4 @CoNi-LDH heterojunction grown on SSM as a highly efficient trifunctional catalyst for water-splitting and Zn-air batteries

Zhuo Wang, Juan Jian, Xiuyan Wang,* Yu Qiao, Meiting Wang, Shuang Gao, Ping Nie and Limin Chang*



PAPERS

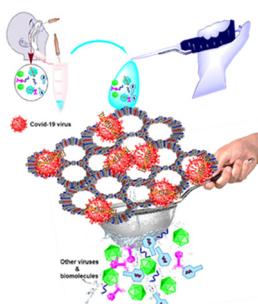
16390



Metal halides $\text{RbCdCl}_3:\text{Sb}^{3+}$ and $\text{Rb}_4\text{CdCl}_6:\text{Sb}^{3+}$ with yellow and cyan emissions obtained via a facile hydrothermal process

Dayu Huang, Pan Zheng, Ziyong Cheng, Qiuyun Ouyang,* Hongzhou Lian* and Jun Lin*

16398



Development of pseudo 3D covalent organic framework nanosheets for sensitive and selective biomolecule detection of infectious disease

Nargish Parvin, Tapas K. Mandal* and Sang W. Joo*

CORRECTION

16411

Correction: Compositional engineering solutions for decreasing trap state density and improving thermal stability in perovskite solar cells

Manala Tabu Mbumba, Davy Maurice Malouangou, Jadel Matondo Tsiba, Muhammad Waleed Akram, Luyun Bai, Yifan Yang and Mina Guli*