

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.

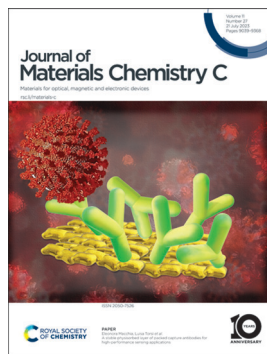
IN THIS ISSUE

ISSN 2050-7526 CODEN JMCCCC 11(27) 9039–9368 (2023)



Cover

See Cheryl Suwen Law *et al.*, pp. 9051–9081. Image reproduced by permission of Cheryl Suwen Law from *J. Mater. Chem. C*, 2023, 11, 9051.



Inside cover

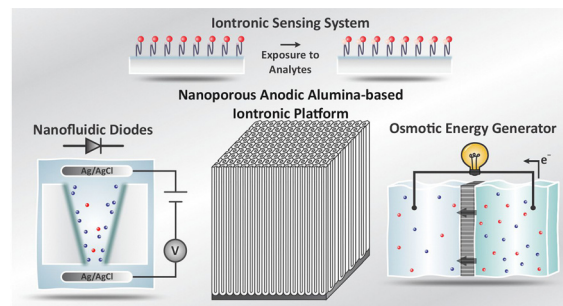
See Eleonora Macchia, Luisa Torsi *et al.*, pp. 9093–9106. Image reproduced by permission of Lucia Sarcina from *J. Mater. Chem. C*, 2023, 11, 9093.

REVIEWS

9051

Nanoporous anodic alumina-based iontronics: fundamentals and applications

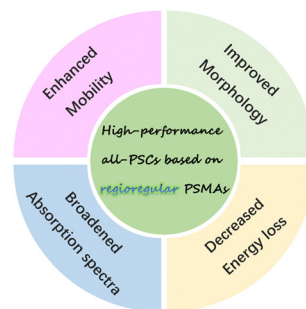
Juan Wang, Khanh Nhlen Vu, Andrew D. Abell, Abel Santos and Cheryl Suwen Law*



9082

Regioregular polymerized small-molecule acceptors for high-performance all-polymer solar cells

Chuantao Gu,* Yu Zhao, Bing Liu, Yong Tian, Yonghai Li, Shasha Wang, Shuguang Wen, Jiping Ma and Xichang Bao*



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, Sam Howell, Evie Karkera, Carole Martin,

Kirsty McRoberts, Ella White

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.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

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, Northwestern University, USA

Unjong Jeong, POSTECH, South Korea

Oana Jurchescu, Wake Forest University, USA

Mingzhu Li, 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

Neil Robertson, University of Edinburgh, UK

Federico Rosei, University of Trieste, Italy

Yana Vayznof, Technical University of Dresden, 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

C. Bai, Chinese Academy of Sciences, China

E. Bittner, University of Houston, USA

T. Bunning, Air Force Research Laboratory, USA

J. Casado, University of Malaga, Spain

R. Chandrasekar, University of Hyderabad, India

Y.-J. Cheng, National Chiao Yung University, Taiwan

M. Chhowalla, Rutgers - The State University of New Jersey, USA

C. Chi, National University of Singapore, Singapore

L. Chua, National University of Singapore, Singapore

D. Evans, Beijing University of Chemical Technology, China

M. Green, King's College London, UK

E. von Hauf, VU Amsterdam, Netherlands

L. Hueso, CIC nanoGUNE, Spain

C. S. Hwang, Seoul National University, Korea

M. Kanatzidis, Northwestern University, USA

T. Kato, The University of Tokyo, Japan

J. Kido, Yamagata University, Japan

H. Kuang, Jiangnan University, China

T. Kusamoto, Institute for Molecular Science, Japan

M. Jeffries-EL, Boston University, USA

M. Lira-Cantú, Catalan Institute of

Nanoscience and Nanotechnology, Spain

S. Marder, University of Colorado Boulder, USA

I. McCulloch, University of Oxford, UK

H. Mori, University of Tokyo, Japan

J. Ouyang, National University of Singapore, Singapore

P. Samori, Université de Strasbourg, France

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

R. Sessoli, University of Florence, Italy

Z. Shuai, Tsinghua University, China

C. Silva, Georgia Institute of Technology, USA

J. Snyder, Northwestern University, Illinois, USA

C. Weder, University of Fribourg, Switzerland

G. Welch, University of Calgary, Canada

W. Wong, Hong Kong Polytechnic University, Hong Kong

P. Woodward, Ohio State University, USA

Y. Yin, UC 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.

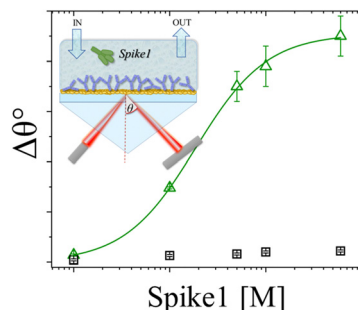
Registered charity number: 207890



9093

A stable physisorbed layer of packed capture antibodies for high-performance sensing applications

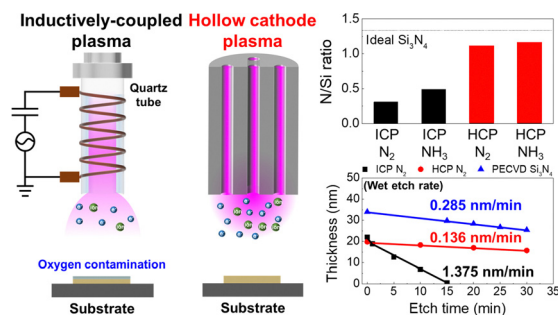
Lucia Sarcina, Cecilia Scandurra, Cinzia Di Franco, Mariapia Caputo, Michele Catacchio, Paolo Bollella, Gaetano Scamarcio, Eleonora Macchia* and Luisa Torsi*



9107

High-quality SiN_x thin-film growth at 300 °C using atomic layer deposition with hollow-cathode plasma

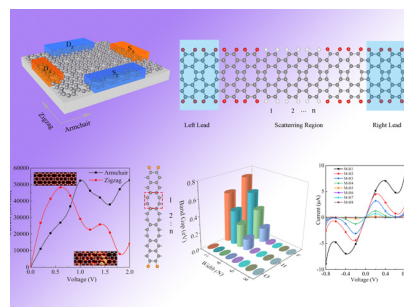
Jae Chan Park, Dae Hyun Kim, Tae Jun Seok, Dae Woong Kim, Ji-Hoon Ahn, Woo-Hee Kim* and Tae Joo Park*



9114

Theoretical insight into the intrinsic electronic transport properties of graphene–biphenylene–graphene nanosheets and nanoribbons: a first-principles study

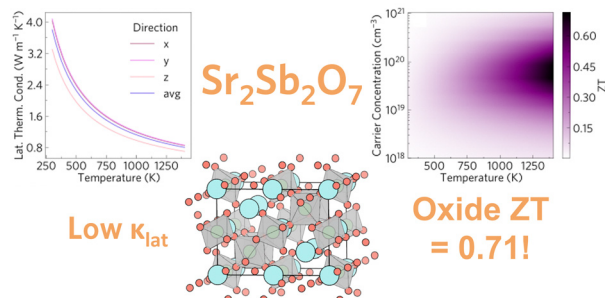
Cheng Luo, Tong Chen,* Xiansheng Dong, Luzhen Xie, Danfeng Qin, Lin Huang, Huili Li and Xianbo Xiao*



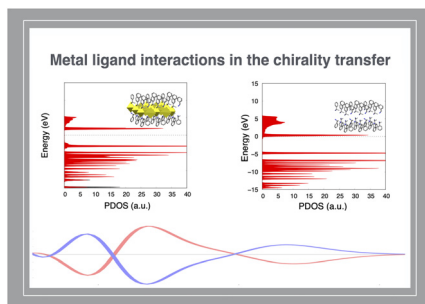
9124

$\text{Sr}_2\text{Sb}_2\text{O}_7$: a novel earth abundant oxide thermoelectric

Luisa Herring Rodriguez, Kieran B. Spooner, Maud Einhorn and David O. Scanlon*



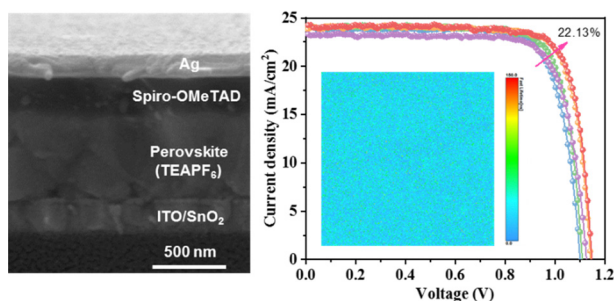
9135



Atomistic modeling of metal–ligand chirality transfer and chiroptical properties of lead and tin hybrid perovskites

Mariagrazia Fortino, Alessandro Mattoni* and Adriana Pietropaolo*

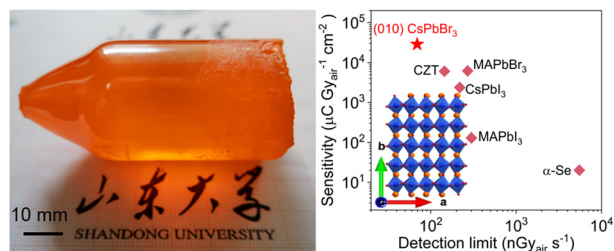
9144



Multifunctional pseudohalide-based ionic liquid doping promotes efficient and stable perovskite solar cells

Xing Guo, Zhenhua Lin,* Wenying Cao, Yumeng Xu, Qingrui Wang, Boyao Zhang, Yue Hao and Jingjing Chang*

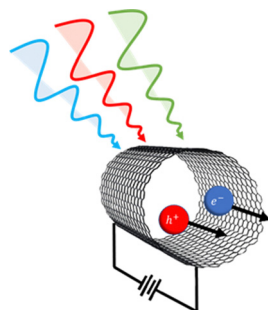
9153



Anisotropic X-ray detection performance of melt-grown CsPbBr₃ single crystals

Yunqiu Hua, Xue Sun, Xiang Li, Fucai Cui, Zhongjie Yue, Jiaxin Liu, Hongjie Liu, Guodong Zhang* and Xutang Tao*

9161



Conjugated wrapping polymer influences on photoexcitation of single-walled carbon nanotube-based thin film transistors

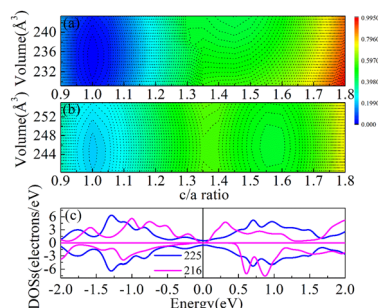
Nicholas J. Dallaire, Brendan Mirka, Joseph G. Manion, William J. Bodnaryk, Darryl Fong, Alex Adronov, Karin Hinzer and Benoît H. Lessard*



9172

Kinetic arrest of atomic diffusion-induced spin gapless semiconductor in Ti_2MnAl Heusler compound

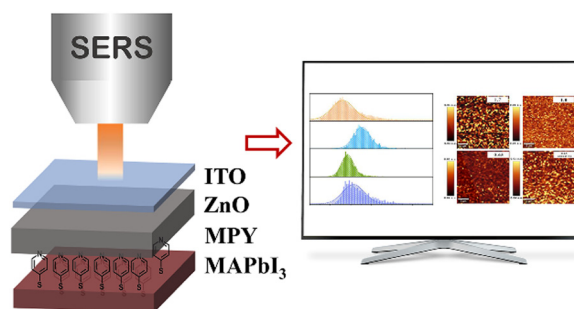
Guijiang Li,* Qihang Sun, Lei Xu, Guodong Liu and Zhenhua Cao



9179

Sensing of the charge transfer process in $\text{ZnO}/\text{MAPbI}_3$ heterojunctions of perovskite solar cells (PSCs) by surface-enhanced Raman scattering

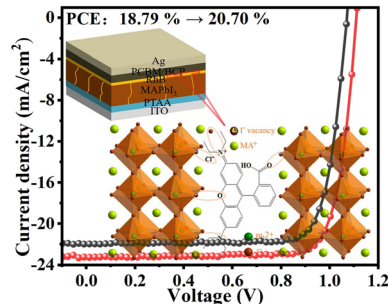
Luzhi Yan, Xiaolei Zhang,* Dongjun Lv, Zhongmin Liu, Fan Yang, Yijun Gao, Xiaoli Wang, Yaolian Jiang and Bing Zhao*



9189

Rhodamine B as an efficient multifunctional passivator for the improvement of perovskite solar cell performance

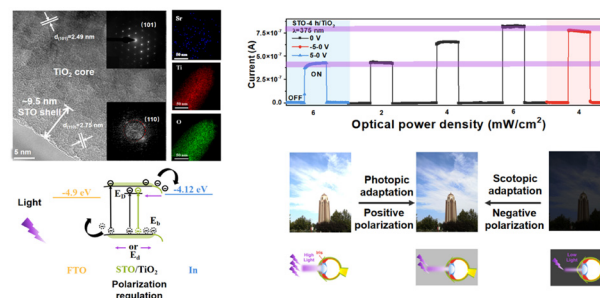
Lei Jin, Yi-Lin Li, Jian Zhou,* Chun-Mei Huang and Xing Liu*



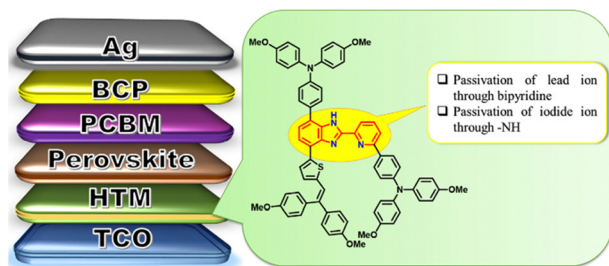
9201

Regulated self-powered photoresponse properties and irradiance-adaptable behavior in ferroelectric $\text{SrTiO}_3/\text{TiO}_2$ heterojunction photodetectors

Songyao Gao, Jianping Xu,* Shaobo Shi, Jing Chen, Jianghua Xu, Lina Kong, Xiaosong Zhang and Lan Li*



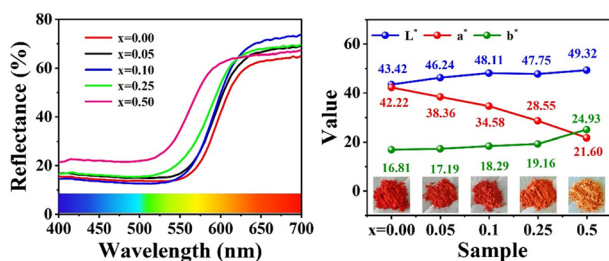
9209



Heterocyclic D–A–D hole-transporting material for high-performance inverted perovskite solar cells

Yogesh S. Tingare,* Chaochin Su,* Wan-Chun Wang, Hong-Jia Lin, Ja-Hon Lin, Xiang-Ching Lin, Chien-Hsiang Lin, Tsai-Wen Huang and Wen-Ren Li*

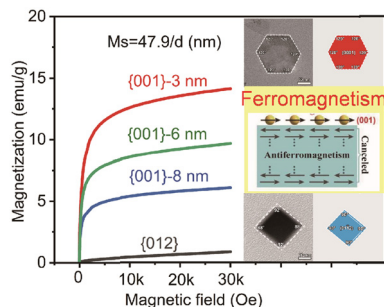
9215



Color modulation of cerium sulfide colorant powders through chemical doping engineering

Hongbin Zhang, Jiasong Zhang, Renguang Ye,* Shiqing Xu and Gongxun Bai*

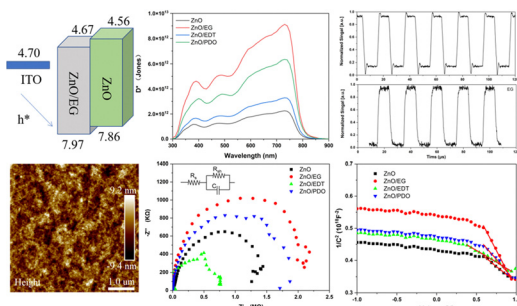
9223



Creation and modulation of ferromagnetism in antiferromagnetic hematite nanoplates

Jiayi Li, Zihan Wang, Sen Li, Chu Ye, Daojiang Gao, Jiangtao Wu,* Guoping Zhao* and Zuo-Guang Ye*

9229



Improved performance of ZnO based inverted organic photodetectors with morphological and interfacial modification

Xiaoya Hou,* Kun Zhang, Jinxiao Li, Jingchong Liang, Wanli Li, Dawei Yan, Lei Liu and Jie Zhang*

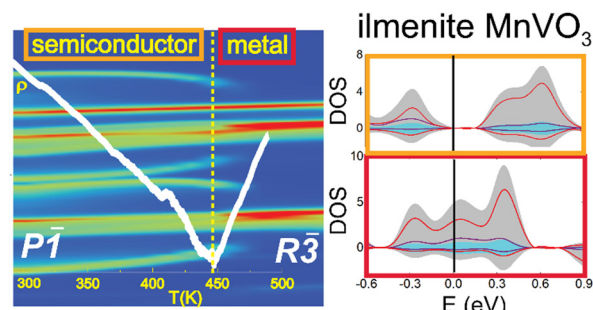


PAPERS

9238

High-pressure ilmenite-type MnVO_3 : crystal and spin structures in the itinerant-localized regimes

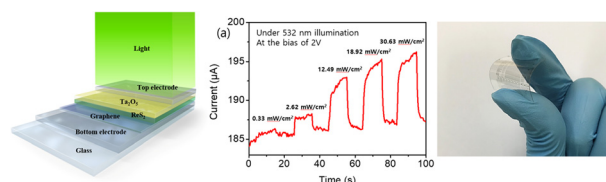
Elena Solana-Madruga, Olivier Mentré, Eugenia P. Arévalo-López, Dmitry Khalyavin, Francois Fauth, Alexandr Missiul and Angel M. Arévalo-López*



9245

Enhanced performance of a photodetector based on a graphene/CVD-grown dendritic $\text{ReS}_2/\text{Ta}_2\text{O}_5$ vertical heterojunction

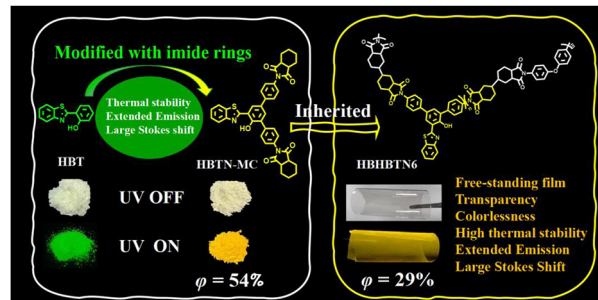
Hyeyoon Ryu, Dohee Kim, Yongsu Choi, Arman Kadyrov, Wook Park and Seunghyun Lee*



9252

Synthesis and characterization of a large Stokes-shifted fluorescent imide and its related polyimides bearing 2-(2'-hydroxyphenyl)benzothiazole moieties

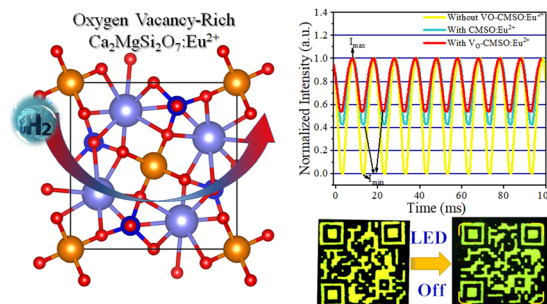
Yuehong Luo, Kaijin Chen, Wenhui Wang, Ruxin Bei, Chuying Li, Yubo Long,* Zhuxin Zhou, Siwei Liu, Zhenguo Chi, Jiarui Xu and Yi Zhang*



9262

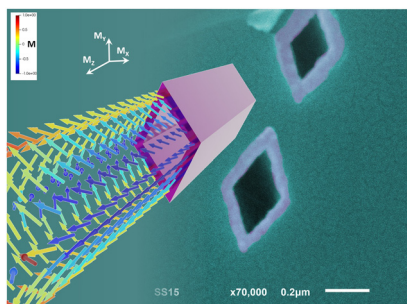
Oxygen-vacancy rich in melilite to modulate the persistent luminescence for multi-functional applications

Youchao Kong, Shurong Chen, Jie He, Shuwei Deng, Xiaoshuang Li* and Jiangcong Zhou*



PAPERS

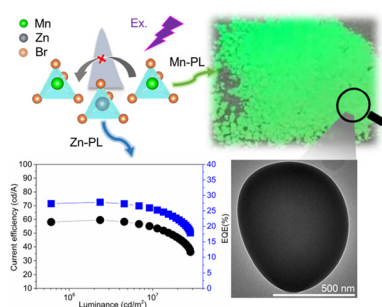
9271



Magneto-structural properties of rhombohedral Ni and Ni–B nanotubes deposited by electroless-plating in track-etched mica templates

Falk Muench,* Sandra Schaefer, Miguel Méndez, Jose Angel Fernández-Roldán, A. Silvia González-García, Víctor Vega,* Ulrike Kunz, Wolfgang Ensinger, Javier García and Víctor M. Prida

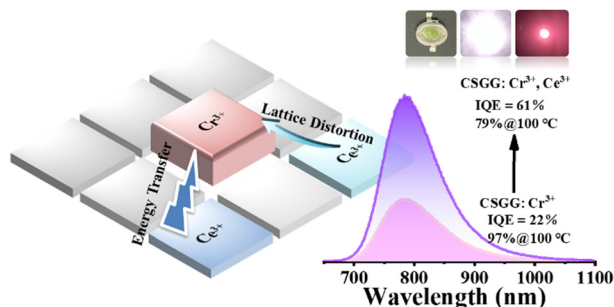
9281



Mn²⁺-doped organic–inorganic hybrids (C₈H₂₀N)₂Zn_{1-x}Mn_xBr₄ as sub-micrometer green phosphors for Mini-LEDs/Micro-LEDs

Sixiang Wang, Yichang Wang, DaeHo Yoon, Tianrong Li* and Yuhua Wang*

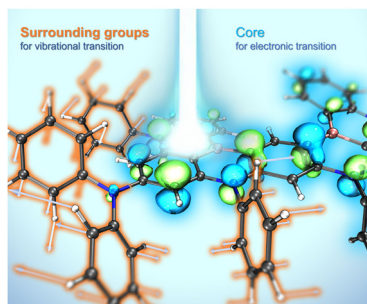
9291



Highly efficient and thermally stable broadband near-infrared emitting garnet Ca₃Sc₂Ge₃O₁₂:Cr³⁺,Ce³⁺ phosphors for multiple pc-LED applications

Yining Wang, Mengmeng Shang,* Yixin Sun, Minliang Deng, Xiaole Xing, Peipei Dang and Jun Lin*

9300



Vibronic transitions determined narrowband emission for multi-resonant thermally activated delayed fluorescence emitters

Heming Zhang,* Lianbao Ke, Zhiqiang Li, Yufang Nie, Jiaxuan Wang, Hai Bi* and Yue Wang

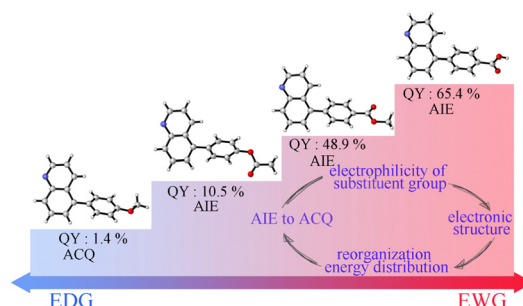


PAPERS

9308

ACQ to AIE transformation of quinoline derivatives: modulating substituent electronic effects to alter excited-state reorganization energy distribution

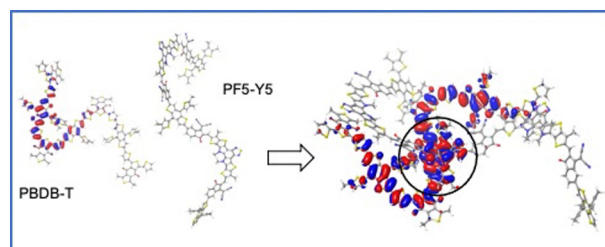
Longjie Wang, Yuchen Zhang, Xiangdi Huang, Yanxiong Liu, Yi Cheng, Wenwen Fan, Liyan Zheng* and Qiue Cao*



9316

Donor–acceptor polymer complex formation in solution confirmed by spectroscopy and atomic-scale modelling

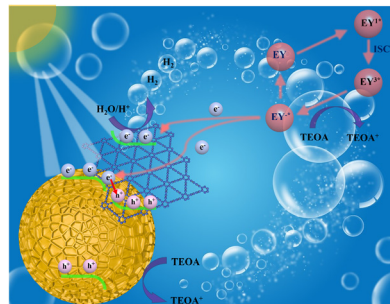
Ishita Jalan, Cleber F. N. Marchiori, Zewdneh Genene, André Johansson, C. Moyses Araujo, Ergang Wang, Jan van Stam and Ellen Moons*



9327

Mechanochemical preparation of graphdiyne (C_nH_{2n-2}) based Ni-doped MoS_2 S-scheme heterojunctions with *in situ* XPS characterization for efficient hydrogen production

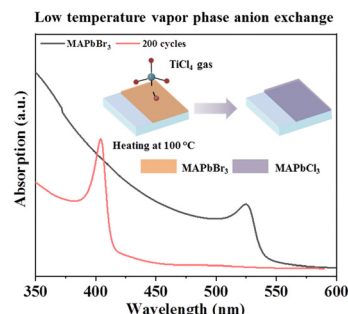
Zhenkun Liu, Youji Li and Zhiliang Jin*



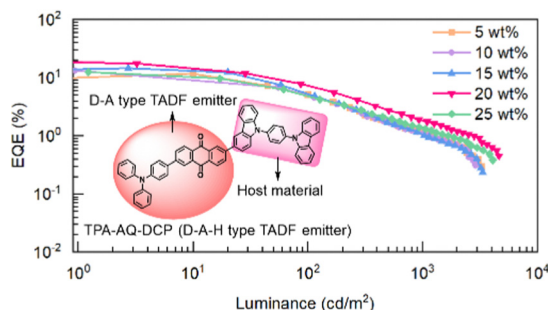
9341

High-performance ultraviolet photodetectors based on MAPbCl₃ perovskites for visible-light-insensitive defect detection

Guobiao Cen, Yibo Lv, Ye Yuan, Genghua Yan, Zhong Ji,* Chuanxi Zhao* and Wenjie Mai*



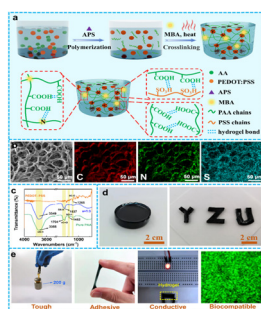
9348



Asymmetric donor–acceptor–host red thermally activated delayed fluorescent emitter for high-efficiency organic light emitting diodes

Hao-Ze Li, Feng-Ming Xie,* Ping Wu, Kai Zhang, Xin Zhao,* Yan-Qing Li* and Jian-Xin Tang*

9355



A low-hysteresis, self-adhesive and conductive PAA/PEDOT:PSS hydrogel enabled body-conformable electronics

Qiang Gao,* Chao Li, Mingxu Wang, Jiadeng Zhu and Chunxia Gao

