

Journal of Materials Chemistry C

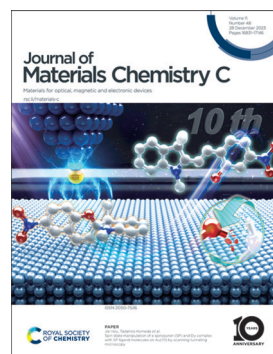
Materials for optical, magnetic and electronic devices

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(48) 16831–17146 (2023)



Cover

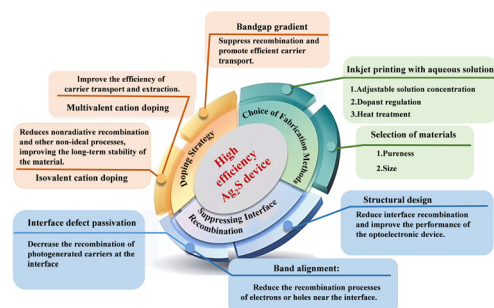
See Jie Hou,
Tadahiro Komeda
et al., pp. 16933–16940.
Image reproduced
by permission of
Jie Hou from
J. Mater. Chem. C,
2023, 11, 16933.

REVIEWS

16842

Silver sulfide thin film solar cells: materials, fabrication methods, devices, and challenges

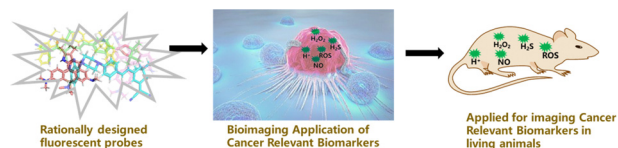
Weiwei Dong, Junjie Fu,* Jin Yang, Shu Ren,
Haonan Zhu, Yusen Wang, Jianchao Hao,
Yange Zhang and Zhi Zheng*



16859

Recent progress of organic fluorescent molecules for bioimaging applications: cancer-relevant biomarkers

Chun Zhang, Yi-Tao Sun, Suyu Gan, Aimin Ren,
Slieman Milaneh, Da-Jun Xiang* and Wen-Long Wang*



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

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

Unjong Jeong, POSTECH, South Korea

Oana Jurchescu, Wake Forest University, USA

Mingzhu Li, Technical 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

Yana Vaynzof, Technical University of Dresden, Germany

Maia Vergnory, 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

F. Dias, Durham University, UK

M. Fourniguet, 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. Heutz, Imperial College London, UK

L. Hueso, CIC nanoGUNE, Spain

C. S. Hwang, Seoul National University, South Korea

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

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

I. McCulloch, University of Oxford, UK

J. Milic, 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

D. Qin, Georgia Institute of Technology, USA

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. Schwingenschlög, King Abdullah University of Science and Technology, Saudi Arabia

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

N. Sessoli, University of Florence, Italy

C. Silva, Georgia Institute of Technology, USA

P. Skabara, University of Glasgow, UK

Y. Song, Institute of Chemistry, CAS, China

J. Travaš-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

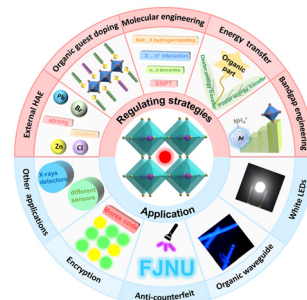


REVIEWS

16890

Regulation and application of organic luminescence from low-dimensional organic–inorganic hybrid metal halides

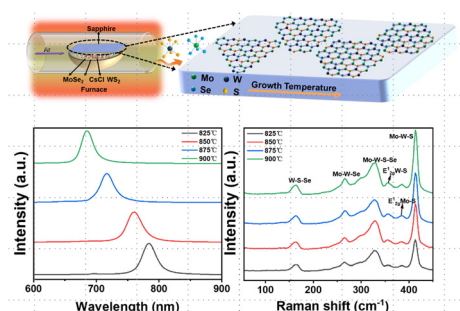
Shanshan Gao, Shuaiqi Wang, Junyan Wu* and Zhenghuan Lin*



16912

Synthesis of millimeter-sized $\text{Mo}_x\text{W}_{(1-x)}\text{S}_2\text{Se}_{2(1-y)}$ monolayer alloys with adjustable optical and electrical properties and their magnetic doping

You Li, Yiwen Wang, Sabir Hussain, Liming Xie and Junjie Qi*

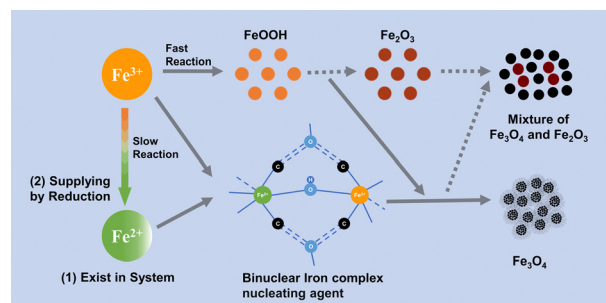


COMMUNICATIONS

16922

Magnetic response of photonic crystals based on nucleating agents of binuclear complexes

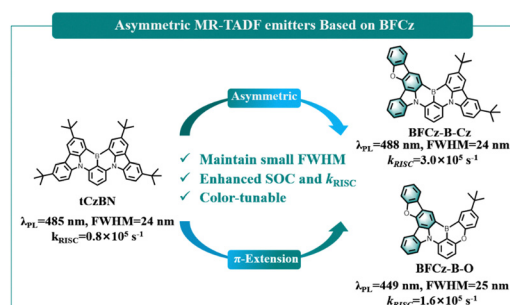
Mengdong Tu, Mengying Xu, Xi Wei, Depeng Gong, Jun Chen and Chaocan Zhang*



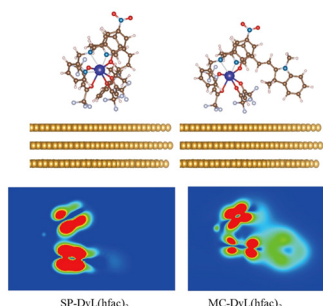
16928

Asymmetric strategy based on 5*H*-benzofuro-[3,2-*c*]carbazole enables efficient narrowband multi-resonance thermally activated delayed fluorescence emitters

Xiangan Song, Shaogang Shen, Shengnan Zou, Fengyun Guo, Shiyong Gao, Ying Wang* and Yong Zhang*



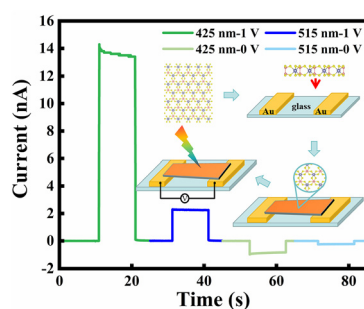
16933



Spin state manipulation of a spiropyran (SP) and Dy complex with SP ligand molecules on Au(111) by scanning tunneling microscopy

Jie Hou,* Dongzhe Li, Lucie Norel, Stéphane Rigaut, Zhipeng Wang, Lei Shan and Tadahiro Komeda*

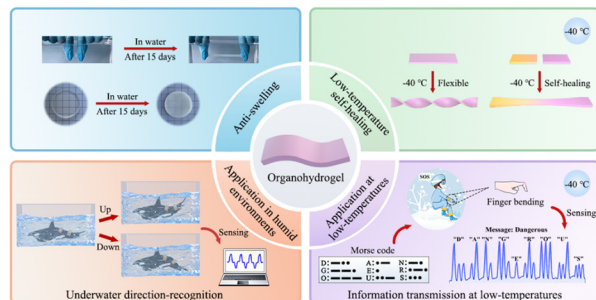
16941



A high-performance self-powered photodetector based on SnP₂S₆ in the visible light region

Shuxian Wang, Jiaming Song,* Linghao Zong, Juanjuan Yang, Bingda Li, Feng Teng, Peng Hu, Haibo Fan and Xin Zhao

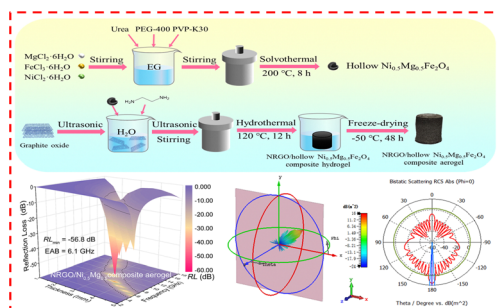
16950



A wet-resistant and low-temperature self-healing organohydrogel sensor towards direction-recognition and information transmission in extreme environments

Enke Feng,* Xiaoqin Li, Mengzhen Zhang, Ying Li and Dailian Wang*

16961



Construction of a hollow nickel–magnesium ferrite decorated nitrogen-doped reduced graphene oxide composite aerogel for highly efficient and broadband microwave absorption

Ruiwen Shu,* Leilei Xu and Ziwei Zhao

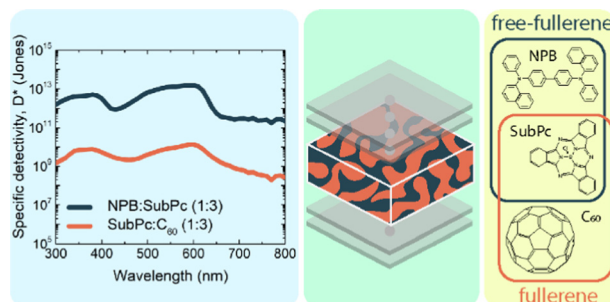


PAPERS

16972

Vacuum-deposited organic photodetectors utilizing non-fullerene acceptors for enhanced detectivity in the green visible light spectrum

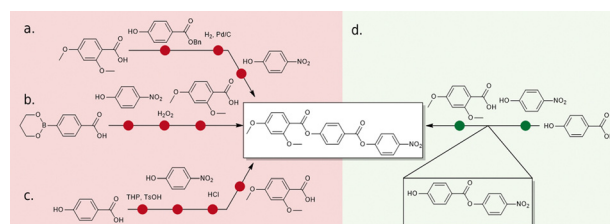
M Rivaldi Ali Septian, Richie Estrada, Chih-Chien Lee, Chih-Hsin Chen, Johan Iskandar, Nurul Ridho Al Amin, Abdul Khalik Akbar, Kasimayan Uma and Shun-Wei Liu*



16982

New RM734-like fluid ferroelectrics enabled through a simplified protecting group free synthesis

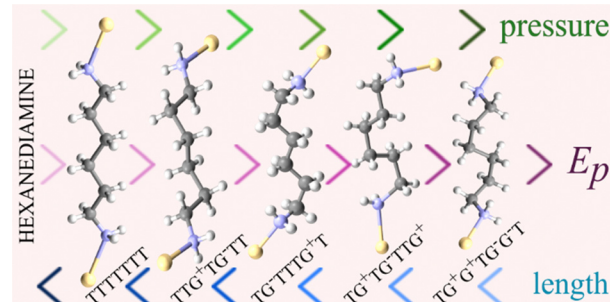
Calum J. Gibb* and Richard J. Mandle



16992

Engineering anomalous elastic properties of coordination polymers and their amorphization by employing flexible linkers

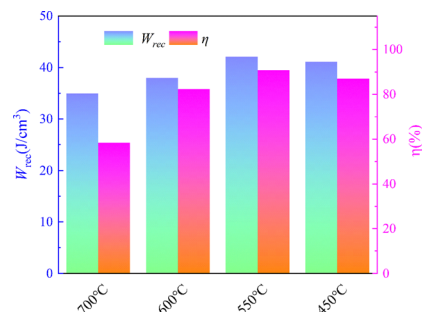
Aleksandra Pótrolniczak, Szymon Sobczak and Andrzej Katrusiak*



17003

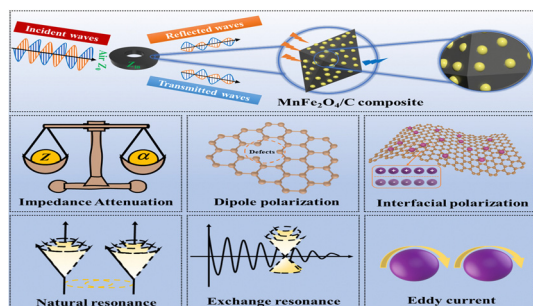
Improved energy storage performance in flexible (PbLa)ZrO₃ thin films via nanocrystalline engineering

Chao Yin, Tiandong Zhang,* Changhai Zhang, Chang Kyu Jeong, Geon-Tae Hwang and Qingguo Chi*



PAPERS

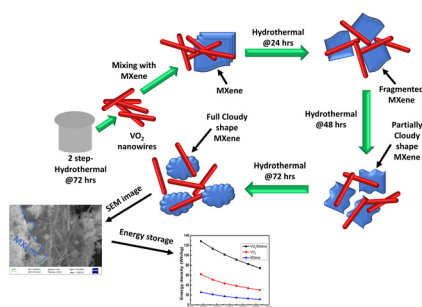
17012



Fabrication of iron manganese metal–organic framework derived magnetic $\text{MnFe}_2\text{O}_4/\text{C}$ composites for broadband and highly efficient electromagnetic wave absorption

Ruiwen Shu,* Jinling Zhang, Shuai Liu and Zaigang Luo

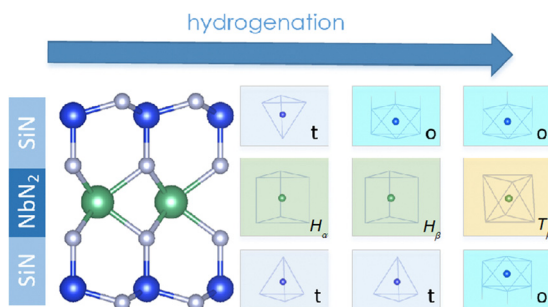
17022



Blending of a 3D cloud-like morphology with a 1D structure in a VO_2/MXene nanocomposite to enhance the charge storage capability

Niraj Kumar,* M. N. M. Ansari, Sanjay Upadhyay,* Vikash Gajraj, Chetana S., Naveen Chandra Joshi, Surajudeen Sikiru and Arijit Sen*

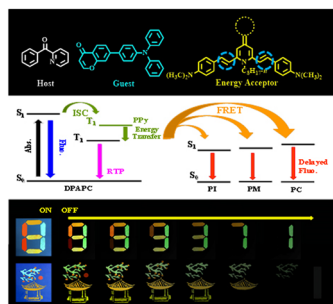
17034



Tunable structural phases and electronic properties of group V MSi_2N_4 ($\text{M} = \text{V}, \text{Nb}, \text{Ta}$) nanosheets via surface hydrogenation: a first-principles study

Yanli Wang* and Yi Ding*

17044



Three-component color-tunable room temperature afterglow doped materials through Förster-resonance energy transfer

Huaiying Huang, Yitian Jiang, Miao Chang Liu,* Wenbo Dai, Yunxiang Lei, Yan Guan,* Qiuping Ding, Huayue Wu and Xiaobo Huang*

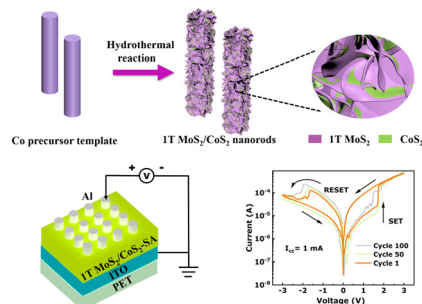


PAPERS

17050

1T MoS₂/CoS₂ heterostructures enabling enhanced resistive switching behavior in sodium alginate-based flexible memristors

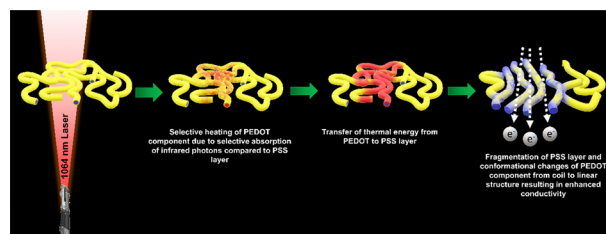
Zipan Jiao, Xiaoyan Lan, Xinglan Zhou, Kunjie Wang, Haoran Zong, Peng Zhang* and Benhua Xu*



17061

Interface engineering towards high conductivity of a model organic plastic micro-surface by microbubble lithography

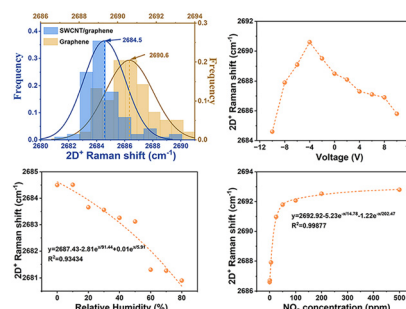
Anand Dev Ranjan, Rakesh Sen, Rahul Vaippully, Sumeet Kumar, Soumya Dutta, Basudev Roy*, Goutam Dev Mukherjee, Soumyajit Roy* and Ayan Banerjee*



17070

External condition-induced interfacial charge transfer in single-walled carbon nanotube/graphene van der Waals heterostructures

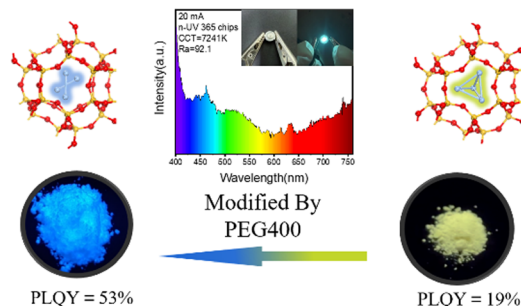
Huan Yin, Ruxuan Zhang, Tian Tian, Zhi Yang, Nantao Hu, Yafei Zhang and Yanjie Su*



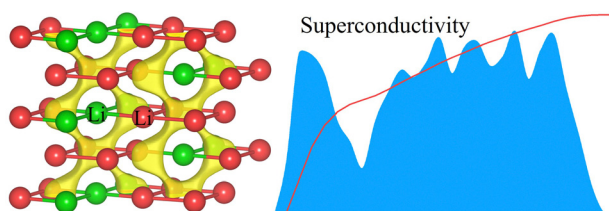
17080

Emission-tunable silver clusters constrained within EMT zeolite

Jinping Yuan, Qianrui Li, Chunmei Yue, Na Wang, Peng Li* and Huanrong Li*



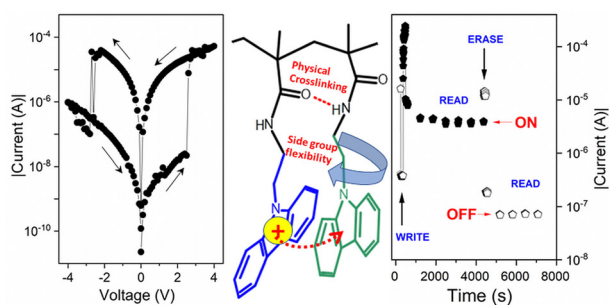
17087



Superconducting $\text{Li}_{11}\text{Sb}_2$ electride at ambient pressure

Yaping Zhao, Jiayu Gao, Xiaohua Zhang,* Shicong Ding, Yong Liu and Guochun Yang*

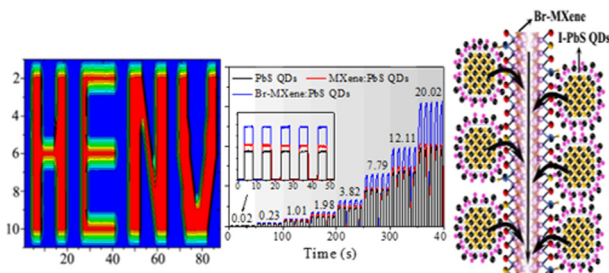
17093



Rewritable resistive memory effect in poly[N-(3-(9H-carbazol-9-yl)propyl)-methacrylamide] memristor

Yadu Ram Panthi, Jiří Pflieger,* Drahomír Výprachtický, Ambika Pandey, Muhammed Arshad Thottappali, Ivana Šeděnková, Magdalena Konefat and Stephen H. Foulger

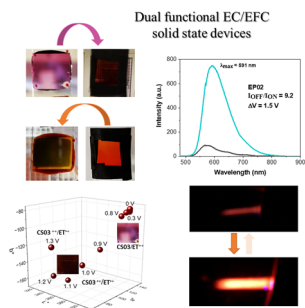
17106



A hybrid quantum dot:MXene bulk heterojunction for an efficient infrared self-powered photodetector

Junyi Huang, Jianfeng Ding, Furui Tan,* Yueyue Gao, Xiayao Lu, Chen Dong, Gentian Yue, Xiaobao Xu* and Liming Ding*

17115



Reversible vis-NIR electrochromic/electrofluorochromic switching in dual-functional devices modulated by different benzothiadiazole-arylamine anodic components

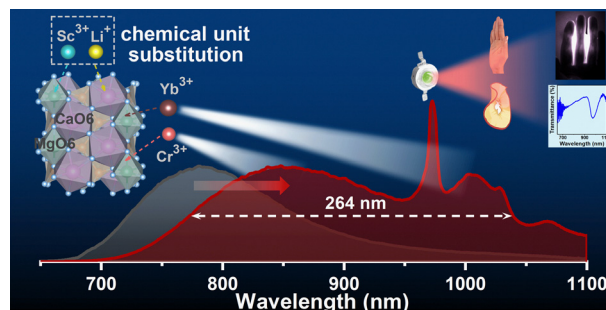
Giuseppina Anna Corrente,* Dora A. González, Ece Aktas, Agostina Lina Capodilupo, Francesco Ruighi, Gianluca Accorsi, Daniela Imbardelli, Cristina Rodriguez-Seco, Eugenia Martinez-Ferrero, Emilio Palomares and Amerigo Beneduci*



17128

Ultra-broadening near-infrared emission of Cr^{3+} -activated pyroxene phosphors via chemical unit substitution and Yb^{3+} co-doping

Shuofeng Sun, Yuming Yang, Renfei Zhang, Qinan Mao,*
Lang Pei, Junhua Xi, Yang Ding, Yiwen Zhu, Hua Yu and
Jiasong Zhong*



17136

Skin-inspired environment-tolerant organohydrogel sensors with balanced mechanical and electrical properties for human motion and physiological signal monitoring

Wenshuai Zhang, Lingxiao Xu,* Cui Lv, Peipei Sun* and
Lei Shi*

