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(25) 8325-8636 (2023)



Cover See Katsuhisa Tanaka *et al.*, pp. 8383–8392. Image reproduced by permission of Katsuhisa Tanaka from *J. Mater. Chem. C*, 2023, **11**, 8383.



Inside cover

See Thomas Rath et al., pp. 8393–8404. Image reproduced by permission of Peter Fürk and Jana B. Schaubeder from J. Mater. Chem. C, 2023, **11**, 8393.

REVIEWS

8337

Exploiting the fraternal twin nature of thermoelectrics and topological insulators in Zintl phases as a tool for engineering new efficient thermoelectric generators

Michael O. Ogunbunmi and Svilen Bobev*



8358

Skin-like hydrogels: design strategy and mechanism, properties, and sensing applications

Lisha Pu, Hui Wang, Yinan Zhao, Zhiang Yuan, Yunqi Zhang, Junjie Ding, Keyu Qu, Wenzhi Sun, Zhongxin Xue, Wenlong Xu* and Xiyan Sun*



Editorial Staff

Deputy Editor

Geraldine Hav Editorial Production Manager

Ionathon 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

Iane 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 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: £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.

Mingzhu Li, Chinese Academy of Sciences,

Kasper Moth-Poulson, 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

T. Kato, The University of Tokyo, Japan

T. Kusamoto, Institute for Molecular Science,

J. Kido, Yamagata University, Japan H. Kuang, Jiangnan University, China

M. Jeffries-EL, Boston University, USA M. Lira-Cantú, Catalan Institute of

I. McCulloch, University of Oxford, UK

Nanoscience and Nanotechnology, Spain S. Marder, University of Colorado Boulder,

H. Mori, University of Tokyo, Japan J. Ouyang, National University of Singapore,

Martyn McLachlan, Imperial College

China

Japan

USA

Singapore

London, UK

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

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 Hyderbad, 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

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

E. von Hauf, VU Amsterdam, Netherlands P. Samori, Université de Strasbourg, France L. Hueso, CIC nanoGUNE, Spain C. S. Hwang, Seoul National University, Korea M. Kanatzidis, Northwestern University, USA R. Seshadri, University of California, Santa Barbara, USA

Hong Kong Zhiguo Xia, South China University of

Hao-Li Zhang, Lanzhou University, China

Technology, China

Oana Jurchescu, Wake Forest University, USA Ni Zhao, Chinese University of Hong Kong,

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

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



article is licensed under a Creative Commons Attribution 3.0 Unported Licence. Published on 29 June 2023. Downloaded on 7/20/2025 11:14:13 PM Open Access Article. This

Executive Editor

8378

The role of the degree of polymerization in the chiroptical properties of dynamic asymmetric poly(diphenylacetylene)s

Juan José Tarrío, Berta Fernández, Emilio Quiñoá and Félix Freire*



PAPERS

8383

Crystal structure and magnetic properties of EuZrO₃ solid solutions

Sihui Li,* Shinya Konishi, Takuya Kito, Koji Fujita and Katsuhisa Tanaka*



8393

The challenge with high permittivity acceptors in organic solar cells: a case study with Y-series derivatives

Peter Fürk, Suman Mallick, Thomas Rath,* Matiss Reinfelds, Mingjian Wu, Erdmann Spiecker, Nikola Simic, Georg Haberfehlner, Gerald Kothleitner, Barbara Ressel, Sarah Holler, Jana B. Schaubeder, Philipp Materna, Heinz Amenitsch and Gregor Trimmel*



8405

Biocompatible cracked reduced graphene oxide strain sensors: enhancing implantable strain sensing performance and durability

Hyun Joo Lee, Bokyeong Ryu, Dong Keon Lee, Hyung Ju Park, Chul Huh, Dong Ick Son, Dong Han Ha, C-Yoon Kim,* Yongseok Jun* and Yong Ju Yun*



8413

A highly stretchable and sensitive strain sensor for lip-reading extraction and speech recognition

Lin Cheng, Diqing Ruan, Yongwei He, Jiayao Yang, Wei Qian, Longwei Zhu, Pindie Zhu, Huaping Wu* and Aiping Liu*



Optical markers of magnetic phase transition in CrSBr

W. M. Linhart,* M. Rybak, M. Birowska, P. Scharoch, K. Mosina, V. Mazanek, D. Kaczorowski, Z. Sofer and R. Kudrawiec

Electrospray prepared flexible CsPbBr₃ perovskite film for efficient X-ray detection

Sixin Chen, Weiwei Liu,* Meng Xu, Pan Shi and Menghua Zhu*

8438

8431

1000 <u>–</u> 0.5

CsPbB



Sensitivity

1.0 1.5 2.0 2.5 3.0 3.5 Absorbed dose rate $(\mu Gy_{air} \cdot s^{-1})$

823.12 µC·Gyair⁻¹·cm⁻²

Bilayer chlorophyll-based bio-photodetector based on Z-type charge transfer process

Yuting Sun, Ziyan Liu, Yuanlin Li, Tianfu Xiang, Aijun Li, Yuhong He, Haotong Wei, Shin-ichi Sasaki, Hitoshi Tamiaki and Xiao-Feng Wang*

8446

Flexible Janus-structured porous fluorescent nanofibers with white-light emission

Minghui Zhang, Shikun Zhao, Zhen Qin, Yuhuan Lv, Han Zhu, Biao Zhao* and Kai Pan*



8454

An enhanced ultrasensitive solar-blind UV photodetector based on an asymmetric Schottky junction designed with graphene/ β -Ga₂O₃/Ag

Song Qi, Jiahang Liu, Jianying Yue, Xueqiang Ji, Jiaying Shen, Yongtao Yang, Jinjin Wang, Shan Li,* Zhenping Wu* and Weihua Tang*



8462

Inducing octahedral distortion to enhance NIR emission in Cr-doped garnet $Ca_3(Al, Sc)_2Ge_3O_{12}$

Chuxin Cai, Shengqiang Liu, Fangyi Zhao, Hao Cai, Zhen Song* and Quanlin Liu*



8470

Pure 2H phase MoSe₂ nanosheets promote the formation of a porous Pbl₂ film and modulate residual stress for highly efficient and stable perovskite solar cells

Huimin Yang, Yang Hao,* Jingkun Ren, Yukun Wu, Qinjun Sun, Chenxi Zhang, Yanxia Cui and Yuying Hao*



8480



Semi-transparent organic solar cells based on large bandgap star-shaped small molecules as mixed donors with PM6

Minming Yan, Peter J. Skabara* and Hong Meng*

8486



Highly efficient warm white light emission in Sb³⁺-doped (NH₄)₄CdCl₆ metal halides through A-site Rb-alloying regulation

Yilin Gao, Qilin Wei, Tong Chang, Miao Ren, Yunfeng Lou, Zhengjie Tian, Yue Fan, Jiandong Yao, Bingsuo Zou and Ruosheng Zeng*

8495



Multi-response upconverted ultraviolet-C photons for tagging and sterilization

Chunzheng Wang, Leipeng Li,* Pinshu Lv, Lingzhu Zi, Shiji Feng, Furong Yang, Jianrong Qiu and Yanmin Yang*

8502



Enhancing NIR-to-visible photon upconversion in cast solid by introducing bulky substituents in rubrene and by suppressing back energy transfer

Akane Sawa, Shota Shimada, Neeti Tripathi, Claire Heck, Hiroaki Tachibana, Emiko Koyama, Toshiko Mizokuro, Yasukazu Hirao, Takashi Kubo, Naoto Tamai, Daiki Kuzuhara, Hiroko Yamada and Kenji Kamada*

8514

8524

for X-ray imaging

Negative solvatochromism and sign inversion of circularly polarized luminescence in chiral exciplexes as a function of solvent polarity

In situ precipitation of $Cs_3Cu_2I_5$ nanocrystals in inorganic glass with long-term water stability

Luojia Huang, Hangtao Ye, Weidong Xiang,*

Hongbin Fan* and Xiaojuan Liang*

Patthira Sumsalee, Pierpaolo Morgante, Gregory Pieters, Jeanne Crassous, Jochen Autschbach* and Ludovic Favereau*







8533

Nucleation-controlled growth of high-quality CsPbBr₃ single crystals for ultrasensitive weak-light photodetectors

Xiao Zhao, Shimao Wang,* Fuwei Zhuge, Nengwei Zhu, Yanan Song, Mengyu Fu, Zanhong Deng, Xiaodong Fang* and Gang Meng*



8541

Ferroelectricity in oxygen-deficient perovskite-type oxide $Sr_{10}Ga_6Sc_4O_{25}$

Akitoshi Nakano,* Ichiro Terasaki and Hiroki Taniguchi





8570



A quantitative model of multi-scale single quantum dot blinking

Eduard A. Podshivaylov, Maria A. Kniazeva, Alexander O. Tarasevich, Ivan Yu. Eremchev, Andrei V. Naumov and Pavel A. Frantsuzov*

8577

Effects of codoping on tin selenide nanomaterials to enhance the thermoelectric performance above the ambient temperature range

Pinaki Mandal, Soumyajit Maitra, Uday Kumar Ghorui, Prasenjit Chakraborty, Bibhutosh Adhikary and Dipali Banerjee*



8590

Formamidinium iodide for instantaneous and fluorescent detection of Pb²⁺ in water

Md Ashiqur Rahman Laskar, Md Tawabur Rahman, Khan Mamun Reza, Abdullah Al Maruf, Nabin Ghimire, Brian Logue and Quinn Qiao*



8600

Efficient hole extraction and dark current suppression in organic photodetectors enabled by atomic-layer-deposition of ultrathin Co₃O₄ interlayers

Ke Lu, Yuanhong Gao,* Zhenhui Wang, Xinwei Wang and Hong Meng*



8609

Tunable near-infrared piezochromic luminescence by effective substituent modification of D–A structures

Jianxun Liu, Guoshuai Du, Ning Liang, Li Yang, Yansong Feng,* Yabin Chen* and Chang-Jiang Yao*





8634

Correction: In(m)-dictated formation of double $Cs_2Ag_xNa_{1-x}Fe_yIn_{1-y}Cl_6$ perovskites

Oleksandr Stroyuk,* Oleksandra Raievska, Anastasia Barabash, Jens Hauch and Christoph J. Brabec