

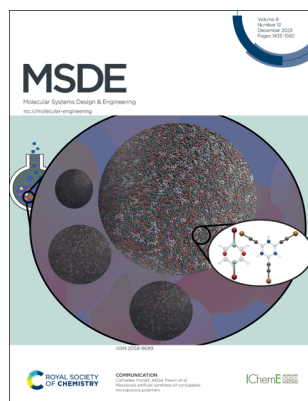
MSDE

Molecular Systems Design & Engineering rsc.li/molecular-engineering

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 2058-9689 CODEN MSDEBG 8(12) 1433-1560 (2023)



Cover

See Catherine Mollart, Abbie Trewin *et al.*, pp. 1456–1461. Image reproduced by permission of Abbie Trewin from *Mol. Syst. Des. Eng.*, 2023, 8, 1456.



Inside cover

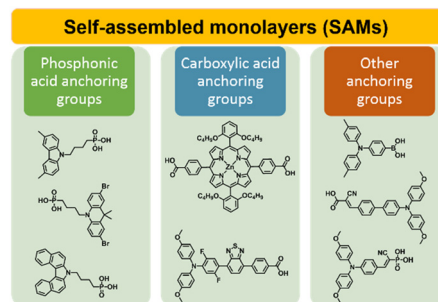
See Savarimuthu Philip Anthony, Vedichi Madhu *et al.*, pp. 1462–1469. Image reproduced by permission of Vedichi Madhu from *Mol. Syst. Des. Eng.*, 2023, 8, 1462.

REVIEW

1440

Self-assembled monolayers as hole-transporting materials for inverted perovskite solar cells

Zhong-Rui Lan, Jiang-Yang Shao* and Yu-Wu Zhong*

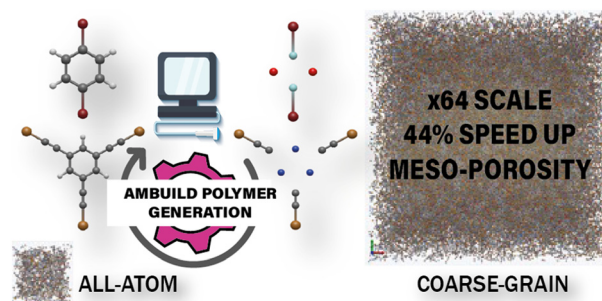


COMMUNICATION

1456

Mesoscale artificial synthesis of conjugated microporous polymers

Catherine Mollart,* Bartosz Ciborowski and Abbie Trewin*



Editorial Staff

Executive Editor

Maria Southall

Deputy Editor

Bianca Provost

Editorial Production Manager

Chris Goodall

Assistant Editors

Sean Browner, Molly Colgate, Paul Scott, Alison Winder

Editorial Assistant

Basita Javeed

Publishing Assistant

Allison Holloway

Publisher

Sam Keltie

For queries about submitted papers, please contact
Chris Goodall, Editorial Production Manager in the first instance.
E-mail: molecularengineering@rsc.org

For pre-submission queries please contact

Maria Southall, Executive Editor.

E-mail: molecularengineering-rsc@rsc.org

MSDE (electronic: ISSN 2058-9689) is published 12 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: £2211; \$3649.

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

MSDE

Molecular Systems Design & Engineering

rsc.li/molecular-engineering

Building and designing systems from the molecular level

Editorial Board

Editor-in-Chief

Claire S. Adjiman, Imperial College London, UK

Deputy Editor-in-Chief

Andrew Ferguson, University of Chicago

Associate Editors

Luke Connal, Australian National University, Australia

Robert Riggelman, University of Pennsylvania, USA

Anna Slater, University of Liverpool, UK

Members

Linda Broadbelt, Northwestern University, USA
LaShanda Korley, University of Delaware, USA

Yongye Liang, Southern University of Science and Technology, China

Anja Palmans, Eindhoven University of Technology, The Netherlands

Patrick Stayton, University of Washington, USA

Advisory Board

Alfredo Alexander-Katz, MIT, USA

Helena Azevedo, Queen Mary University of London, UK

Andre Bardow, ETH Zurich, Switzerland

Jeremy Baumberg, University of Cambridge, UK

Eva Blasco, Heidelberg University, Germany

Joao Cabral, Imperial College London, UK

Neil Champness, University of Nottingham, UK

Paulette Clancy, John Hopkins University, USA

Marc-Olivier Coppens, UCL, UK

Graeme Day, University of Southampton, UK

Andrew deMello, ETH Zurich, Switzerland

Juan de Pablo, University of Chicago, USA

Cecile Dreiss, Kings College London, UK

Thomas Epps III, University of Delaware, USA

Lei Fang, Texas A&M University, USA

C. Daniel Frisbie, University of Minnesota, USA

Xuefeng Guo, Peking University, China

Kristi Kiick, University of Delaware, USA

Raju Kumar Gupta, Indian Institute of Technology Kanpur, India

Sarah Heilshorn, Stanford University, USA

Arthi Jayaraman, University of Delaware, USA

Takashi Kato, University of Tokyo, Japan

Sang Ouk Kim, KAIST, Republic of Korea

Jodie Lutkenhaus, Texas A&M University, USA

Heidi Mansour, University of Arizona, USA

Bert Meijer, Eindhoven University of Technology, Netherlands

Takashi Nakanishi, NIMS, Japan

Ki Tae Nam, Seoul National University, Republic of Korea

Insup Noh, Seoul National University of Science & Technology, Republic of Korea

Mark A. Olson, Tianjin University, China

Ho Bum Park, Hanyang University, South Korea

Jon Parquette, Ohio State University, USA

Boaz Pokroy, Technion – Israel Institute of Technology, Israel

Jeffrey Rimer, University of Houston, USA

Shu Seki, Kyoto University, Japan

Randy Snurr, Northwestern University, USA

Brigitte Stadler, Aarhus University, Denmark

Doros Theodorou, National Technical University of Athens, Greece

Matthew Tirrell, University of Chicago, USA

Bernhardt L. Trout, MIT, USA

Raymond W. Y. Wong, Hong Kong Polytechnic University, Hong Kong

Jia Zhu, Nanjing University, China

Meifang Zhu, Donghua University, China

Information for Authors

Full details on how to submit material for publication in MSDE 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/molecular-engineering. Submissions: The journal welcomes submissions of manuscripts for publication as Review Articles and Minireviews. Full Papers and Communications should describe original work of high quality and impact.

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.

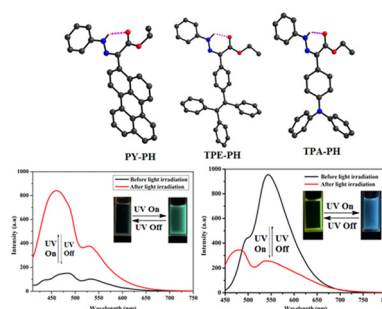
Registered charity number: 207890



1462

Fluorophore unit controlled photoswitching of hydrazone derivatives: reversible and irreversible off-on/dual-color fluorescence photoswitches

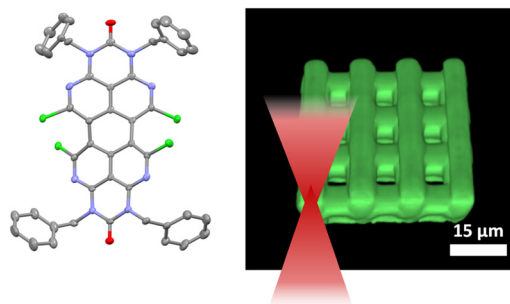
Deepanjaly K. Sivasdas, Sasikala Ravi, Palaniyappan Nagarasu, Delna Johnson, Vijay Thiruvengatam, Savarimuthu Philip Anthony* and Vedichi Madhu*



1470

Two-photon microprinting of 3D emissive structures using tetraazaperylene-derived fluorophores

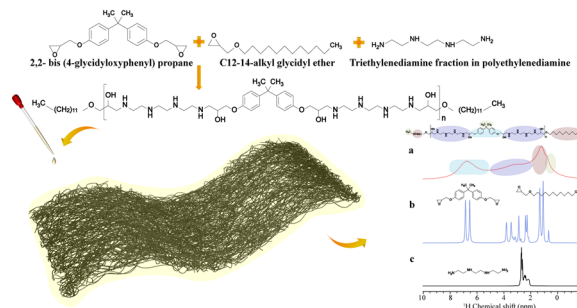
Robert Eichelmann, Joël Monti, Li-Yun Hsu, Finn Kröger, Joachim Ballmann, Eva Blasco* and Lutz H. Gade*



1477

Dynamic monitoring of epoxy reactions and modulus evaluation by a multispectral approach

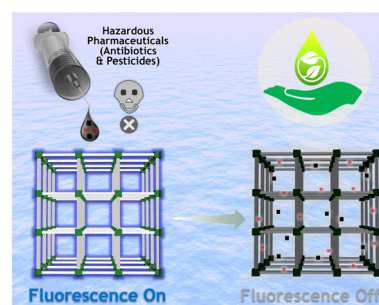
Jinru Liu, Bingyu Huang, Xuan Sun, Kaina Wang, Ligang Xu, Chenjie Lou, Susan Walter, Thomas Herzog, Henning Heuer, Jipeng Fu* and Mingxue Tang*



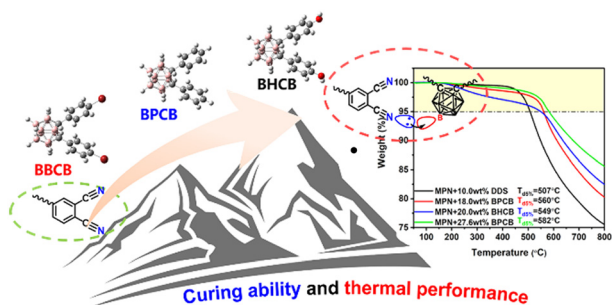
1483

A luminescent cationic MOF and its polymer composite membrane elicit selective sensing of antibiotics and pesticides in water

Subhajit Dutta, Writakshi Mandal, Aamod V. Desai, Sahel Fajal, Gourab K. Dam, Soumya Mukherjee* and Sujit K. Ghosh*



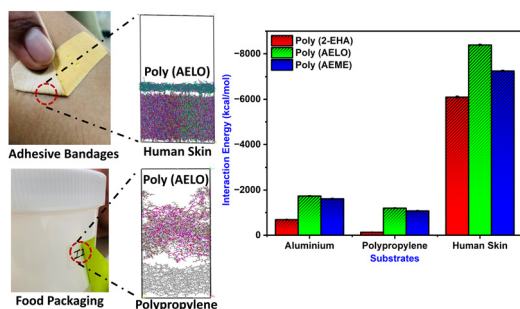
1492



A new approach to enhance the performance of phthalonitrile: study of carborane curing agents with dual functions

Zichun Ding, Lishuai Zong, Chenghao Wang, Siying Wang, RunZe Liu, Xigao Jian and Jinyan Wang*

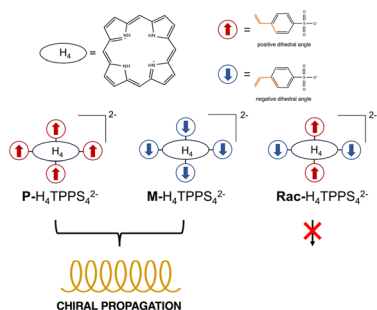
1498



Combined computational and experimental approach for bio-sourced monomers to design green pressure-sensitive adhesives

Manjinder Singh, Sushanta K. Sahoo and Gaurav Manik*

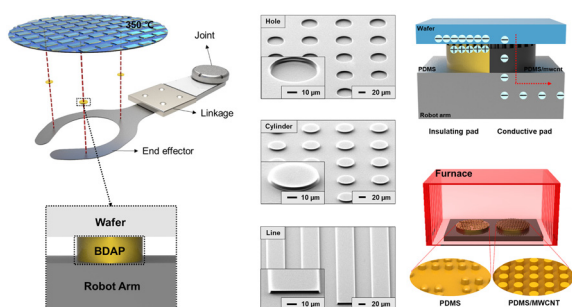
1512



Chiral self-organization of the TPPS₄ porphyrin assisted by molecular rotations

Gioacchino Schifino, Mariagrazia Fortino, Luigi Monsù Scolaro* and Adriana Pietropaolo*

1520



Bio-inspired dry adhesive pads using multi-walled carbon nanotube/polydimethylsiloxane composites for efficient wafer transfer robot arms in smart factories

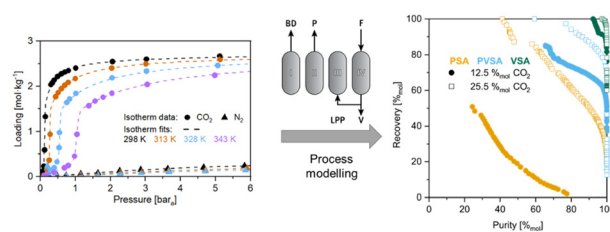
Bom Lee, Young Chun Ko, Simon Kim, Su Eon Lee, Ho Jun Jin, Dong Joon Chang, Min-Ho Park* and Bong Hoon Kim*



1526

Evaluating the CO₂ capture performance of a “phase-change” metal–organic framework in a pressure–vacuum swing adsorption process

David Danaci,* Elena Pulidori, Luca Bernazzani, Camille Petit and Marco Taddei*



1540

Dehydration induced selective ion trapping by topology constrained atomically thin graphene–crown membranes

Pooja Sahu and Sk. Musharaf Ali*

