

Materials Advances

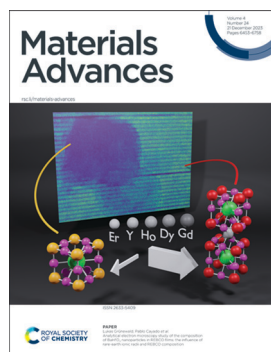
An open access journal publishing across the breadth of materials science

rsc.li/materials-advances

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.

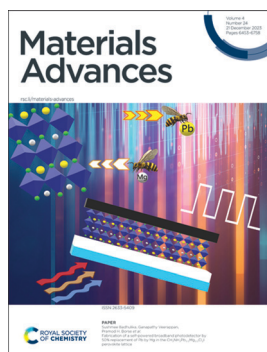
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 4(24) 6453-6758 (2023)



Cover

See Lukas Grünewald, Pablo Cayado *et al.*, pp. 6507–6521. Image reproduced by permission of Lukas Grünewald from *Mater. Adv.*, 2023, 4, 6507.



Inside cover

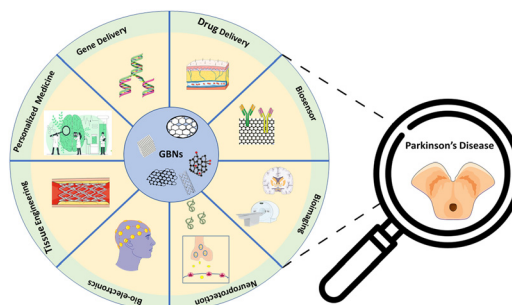
See Sushmee Badhulika, Ganapathy Veerappan, Pramod H. Borse *et al.*, pp. 6522–6534. Image reproduced by permission of Pramod H. Borse from *Mater. Adv.*, 2023, 4, 6522.

REVIEWS

6464

Advances in graphene-based nanoplatforms and their application in Parkinson's disease

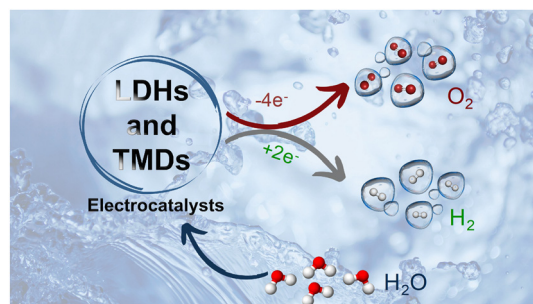
Tuba Oz, Ajeet Kumar Kaushik and Małgorzata Kujawska*



6478

2D layered double hydroxides and transition metal dichalcogenides for applications in the electrochemical production of renewable hydrogen

Daniele Alves, P. Rupa Kasturi, Gillian Collins, Tara N Barwa, Sukanya Ramaraj, Raj Karthik and Carmel B. Breslin*



Editorial Staff**Executive Editor**

Jeremy Allen

Deputy Editor

Hannah Kerr

Editorial Production Manager

Daniella Ferlucio

Assistant Editors

Zita Zachariah, Serra Arslanac Sengelen, Zifei Lu and Ashley Mitchinson

Editorial Assistant

Rosie Hague

Publishing Assistant

Allison Holloway

Publisher

Neil Hammond

For queries about submitted papers, please contact Daniella Ferlucio, Editorial Production Manager in the first instance. E-mail: materialsadvances@rsc.org

For pre-submission queries please contact

Jeremy Allen, Executive Editor.

E-mail: materialsadvances-rsc@rsc.org

Materials Advances (electronic: ISSN 2633-5409) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

Materials Advances is a Gold Open Access journal and all articles are free to read. Please email orders@rsc.org to register your interest or contact 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

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

Materials Advances

rsc.li/materials-advances

Materials Advances publishes experimental and theoretical work across the breadth of materials science.

Editorial Board**Editors-in-Chief**

Anders Hagfeldt, EPFL, Switzerland
Jeroen Cornelissen, University of Twente, The Netherlands
Natalie Stingelin, Georgia Institute of Technology, USA

Associate Editors

A. S. Achalkumar, Indian Institute of Technology, India
Veronica Augustyn, North Carolina State University, USA
Viola Birss, University of Calgary, Canada
Kaushik Chatterjee, Indian Institute of Science, India
Elizabeth Cosgriff-Hernandez, University of Texas at Austin, USA
Rachel Crespo-Otero, Queen Mary University of London, UK
Gemma-Louise Davies, University College London, UK
Goutam De, S N Bose National Centre for Basic Sciences, India
Renaud Demadrille, Interdisciplinary Research Institute of Grenoble, France
Håkan Engqvist, Uppsala University, Sweden
Antonio Facchetti, Georgia Institute of Technology, USA

Ghim Wei Ho, National University of Singapore, Singapore
Yun Jeong Hwang, Korea Institute of Science and Technology, South Korea
Unyong Jeong, POSTECH, South Korea
Ji Jian, Zhejiang University, China
Oana Jurchescu, Wake Forest University, USA
Kisuk Kang, Seoul National University, South Korea
Subrata Kundu, Central Electrochemical Research Institute (CECRI), India
Dan Li, Jinan University, China
Mingzhu Li, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China
Shaoqin Liu, Harbin Institute of Technology, China
David Lou, Nanyang Technological University, Singapore
Yi-Chun Lu, The Chinese University of Hong Kong, Hong Kong
Martyn McLachlan, Imperial College London, UK
Yoshiko Miura, Kyushu University, Japan
Kasper Moth-Poulsen, Chalmers University of Technology, Sweden
Ana Flavia Nogueira, University of Campinas,

Brazil
Erin Ratcliff, University of Arizona, USA
Jennifer Rupp, Massachusetts Institute of Technology, USA
Miriam Unterlass, Vienna University of Technology, Austria
Yana Vaynzof, Technical University of Dresden, Germany
Maia Vergniory, Max Planck Institute for Chemical Physics of Solids, Germany
Jessica Winter, Ohio State University, USA
Lydia Wong, Nanyang Technological University, Singapore
Li-Zhu Wu, Technical Institute of Physics and Chemistry, China
Zhiguo Xia, South China University of Technology, China
Yusuke Yamauchi, University of Queensland, Australia
Chengzhong Yu, University of Queensland, Australia
Haoli Zhang, Lanzhou University, China
Ni Zhao, Chinese University of Hong Kong, Hong Kong
Zhen Zhou, Nankai University, China

Advisory Board

Please see the Materials Advances journal webpage for full details of our advisory board: rsc.li/materials-advances

Information for Authors

Full details on how to submit material for publication in Materials Advances 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-advances

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

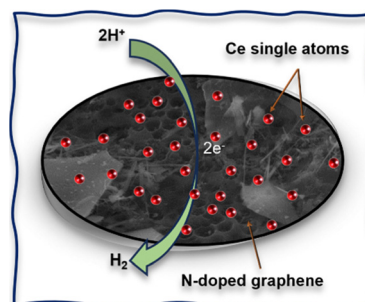


COMMUNICATION

6498

Promising Ce single-atom-dispersed nitrogen-doped graphene catalysts for the hydrogen evolution reaction

Sunny Yadav, Vandung Dao, Wenmeng Wang, Kai Chen, Chiyeop Kim, Gyu-Cheol Kim and In-Hwan Lee*

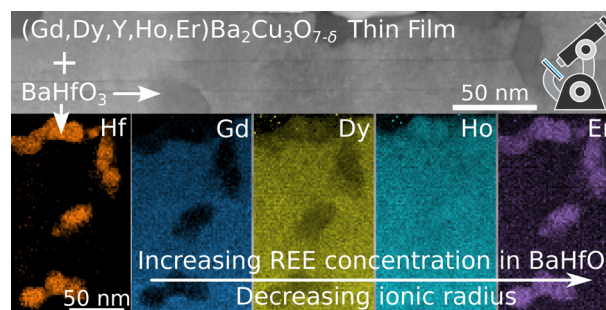


PAPERS

6507

Analytical electron microscopy study of the composition of BaHfO₃ nanoparticles in REBCO films: the influence of rare-earth ionic radii and REBCO composition

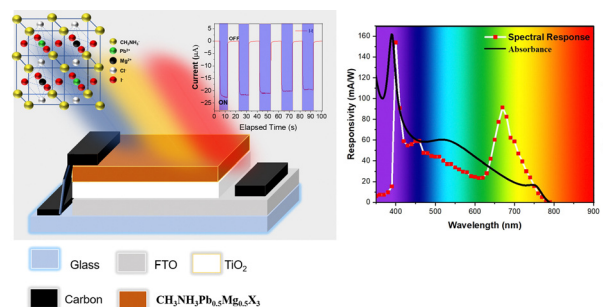
Lukas Grünewald, Pablo Cayado,* Manuela Erbe, Jens Hänisch,* Bernhard Holzapfel and Dagmar Gerthsen



6522

Fabrication of a self-powered broadband photodetector by 50% replacement of Pb by Mg in the CH₃NH₃Pb_{0.5}Mg_{0.5}Cl₂ perovskite lattice

Kumaar Swamy Reddy B., Smrutiranjana Panda, Easwaramoorthi Ramasamy, Sushmee Badhulika,* Ganapathy Veerappan* and Pramod H. Borse*

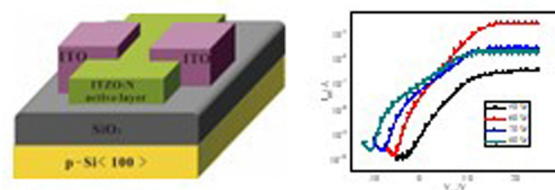


6535

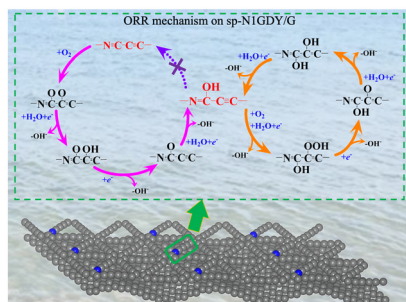
Amorphous N-doped InSnZnO thin films deposited by RF sputtering for thin-film transistor application

Zhi-Yue Li, Shu-Mei Song, Wanxia Wang,* Ming-Jiang Dai, Song-Sheng Lin, Ting-Yong Chen and Hui Sun*

- ◆ The influence of RF sputtering power on TFT's performance was studied
- ◆ ITZO:N film prepared with suitable sputtering power enhance the performance of TFT



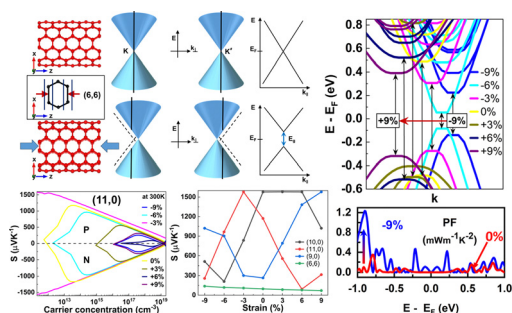
6542



DFT investigation of the oxygen reduction reaction over nitrogen (N) doped graphdiyne as an electrocatalyst: the importance of pre-adsorbed OH* and the solvation effect

Yuelin Wang, Thanh Ngoc Pham, Harry H. Halim, Likai Yan and Yoshitada Morikawa*

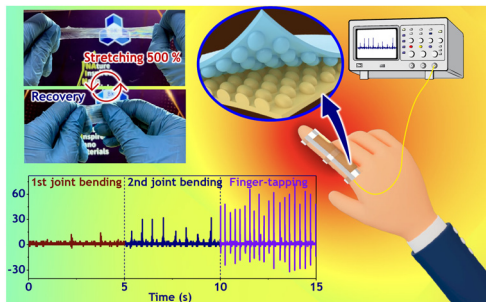
6553



Ab initio study of uniaxial strain-induced thermoelectric property tuning of individual single-wall carbon nanotubes

Md. Mafizul Islam and Ahmed Zubair*

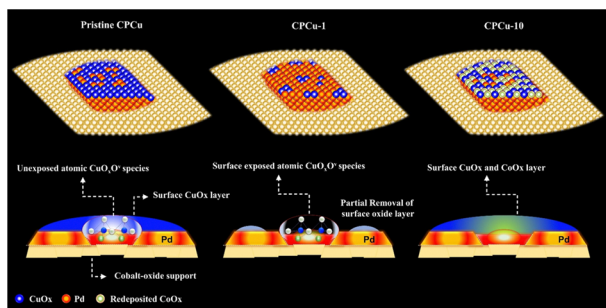
6568



Ultra-stretchable and shape-memorable ability of an output-boosted triboelectric nanogenerator utilizing highly ordered microdome-crowning thermoplastic polyurethane for a finger-motion detection sensor

Ngoc Mai Chau, Phuong Mai Tran, Thu Ha Le, Thi Thai Ha La* and Van-Tien Bui*

6578



Facile surface restructure by one-step sub-millisecond laser exposure promotes the CO₂ methanation performance of cobalt oxide supported Pd nanoparticles with copper-oxide cluster decoration

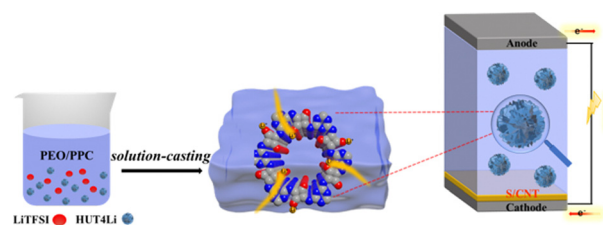
Dinesh Bhalothia, Amisha Beniwal, Praveen Kumar Saravanan, Guo-Heng Huang, Mingxing Cheng, Ming-Wei Lin, Po-Chun Chen* and Tsan-Yao Chen*



6589

Zwitterionic metal covalent organic frameworks constructed from lithium salts to reinforce poly(ethylene oxide)/poly(propylene carbonate) composite polymer electrolytes

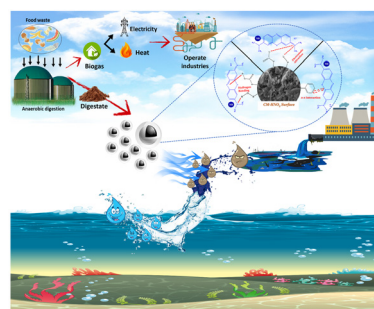
Hui Liu,* Li Jing, Juanjuan Liu, Hongxing Guo, Tao Li and Xiaojie Zhang*



6599

Harnessing a carbon-based material from food waste digestate for dye adsorption: the role of hydrogel beads in enhancing the material stability and regenerative capacity

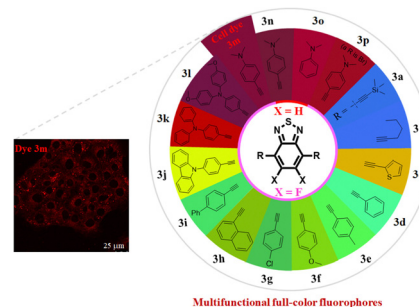
Salaheddine Farsad,* Asma Amjlef, Ayoub Chaoui, Aboubakr Ben Hamou, Chaima Hamma, Mohamed Benafqir, Amane Jada and Noureddine El Alem*



6612

Full-color emission of fluorinated benzothiadiazole-based D-A-D fluorophores and their bioimaging applications

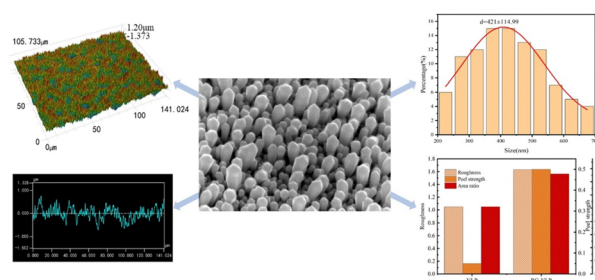
Si-Hong Chen, Xi-Ying Cao, Peng-Tao Hu, Kai Jiang,* Yong-Tong Liang, Bing-Jia Xu, Zhong-Hao Li and Zhao-Yang Wang*



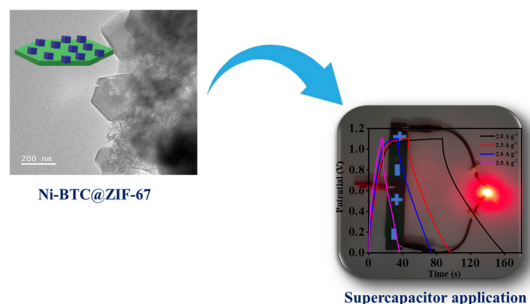
6621

Preparation of an ultra-low profile and high peel strength copper foil with rice-grain microstructures

Lijuan Wang, Xiaowei Fa, Yunzhi Tang,* Juan Liao, Yuhui Tan,* Ning Song, Jian Huang, Zhen Sun, Men Zhao, Weifei Liu and Man Zhao



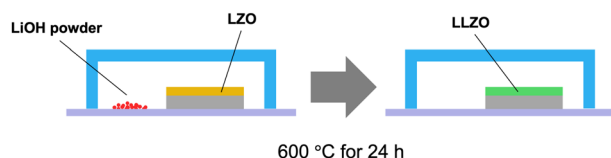
6627



Robust MOF-on-MOF heterostructures as efficient cathode candidates for next-generation supercapacitors

Rakesh Deka, Viresh Kumar and Shaikh M Mobin*

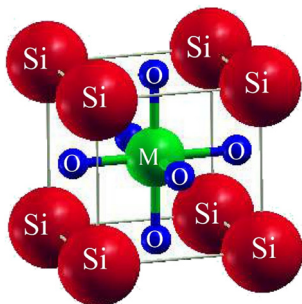
6638



Post-lithiation: a way to control the ionic conductivity of solid-state thin film electrolyte

Jixi Chen,* Alessandro Pallioto, Shinhee Yun, Dennis Valbjørn Christensen, Vincenzo Esposito and Nini Pryds*

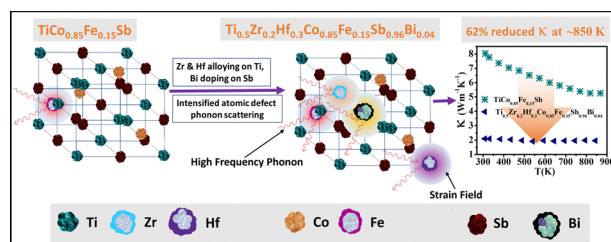
6645



Computational study of the physical characteristics of Si-based oxide perovskites for energy generation using DFT

Amjad Ali Pasha, Hukam Khan, Mohammad Sohail,* Nasir Rahman, Rajwali Khan, Omar H. Alsalmi, Dilsora Abduvalieva, Khamael M. Abualnaja, Atef El Jery and Mouataz Adrery

6655



Approaching the minimum lattice thermal conductivity in TiCoSb half-Heusler alloys by intensified point-defect phonon scattering

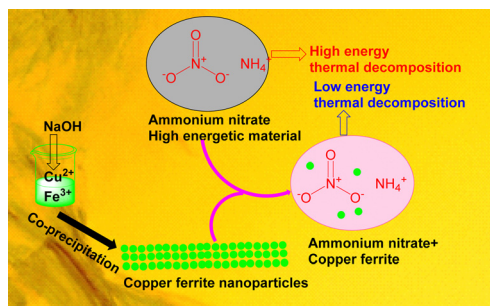
Ajay Kumar Verma, Shamma Jain, Kishor Kumar Johari, Christophe Candolfi, Bertrand Lenoir,* Sumeet Walia, S. R. Dhakate and Bhasker Gahtori*



6665

Comparative study of the thermal decomposition of ammonium nitrate in the presence of nanocrystalline copper ferrite

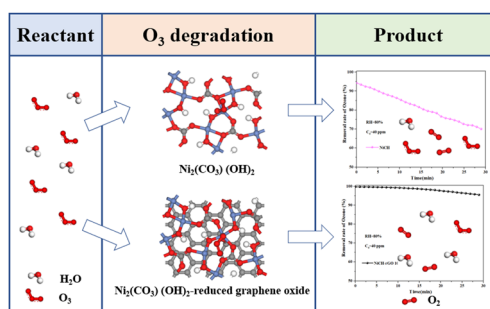
Pragnesh N. Dave* and Ruksana Sirach



6673

rGO nickel matrix composites with high ozone degradation efficiency under high humidity

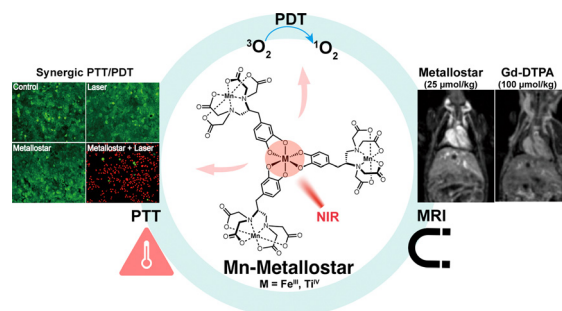
Qian Zhang,* Wenyan Xiao, Bangxin Li, Yu Lin, Lingyu Huang, Jifei Liao, Huiguo Han, Jie Zhu and Yan Fu



6682

Coordination-driven self-assembled Mn(II)-metallostar with high relaxivity and synergistic photothermal and photodynamic effects

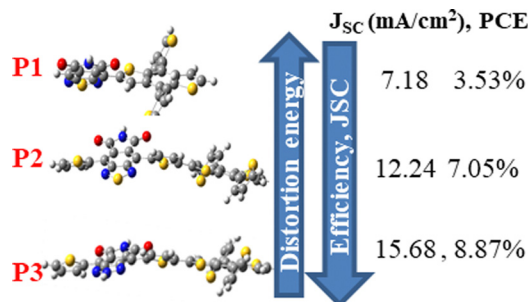
Huiyu Wu, Zhenghui Li, Yao Liu, Xingchi Shi, Yuan Xue, Zuhua Zeng, Fanglin Mi, Haiying Wang* and Jiang Zhu*



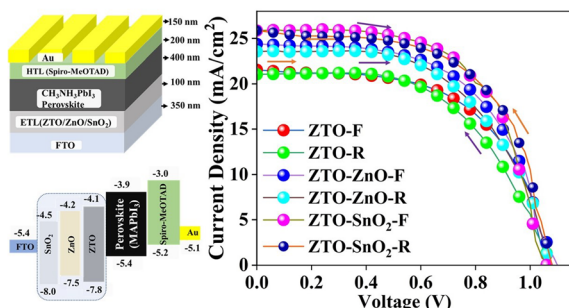
6694

Tailoring intra-molecular coupling in BDT-based copolymers to enhance their performance in fullerene-free organic solar cells

Newayemedhin A. Tegege,* Asfaw Negash,* Desalegn Yilma, Kidan G. Gebremariam, Zewdneh Genene, Wendimagegn Mammo and Neill J. Goosen



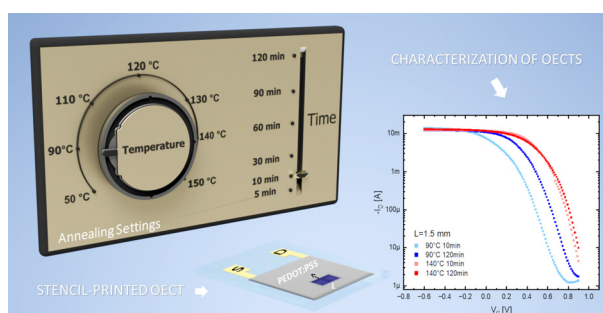
6704



Enhancing the perovskite solar cell performance by the interface modification of Zn–Sn–O compound heterostructures

Ranjith Kumar Poobalan, Ramarajan Ramanathan,*
Chellakumar R., K. Ravichandran and Michel Zinigrad

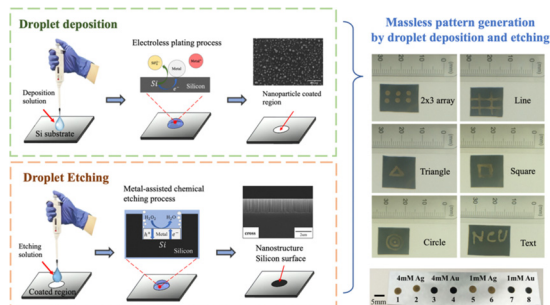
6718



Experimental design of stencil-printed high-performance organic electrochemical transistors

Amir Mohammad Ghafari, Michele Catacchio,
Emil Rosqvist, Axel Luukkonen, Anni Eklund,
Kim Björkström, Paolo Bollella, Luisa Torsi,
Eleonora Macchia* and Ronald Österbacka*

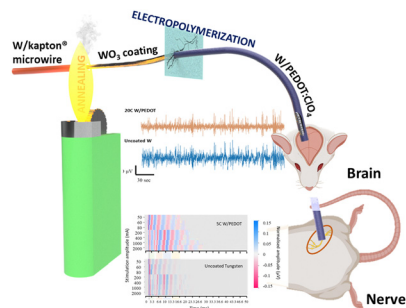
6730



Maskless patterning of metal nanoparticles and silicon nanostructures by a droplet deposition and etching process

Chia-Wen Tsao* and Ping-Chin Shen

6741



Electrodeposition of PEDOT:ClO₄ on non-noble tungsten microwire for nerve and brain recordings

Amparo Güemes, Antonio Dominguez-Alfaro,
Ryo Mizuta, Santiago Velasco-Bosom,
Alejandro Carnicer-Lombarte, Damiano G. Barone,
David Mecerreyes and George Malliaras*



CORRECTIONS

6754

Correction: The state of understanding of the electrochemical behaviours of a valve-regulated lead–acid battery comprising manganese dioxide-impregnated gel polymer electrolyte

Bipin S. Chikkatti, Ashok M. Sajjan* and Nagaraj R. Banapurmath

6755

Correction: Green pepper-derived hierarchical porous carbon for supercapacitors with high performance

Yicheng Zeng, Fuming Zhang, Jinggao Wu and Jing Huang*

