

Materials Horizons

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ISSN 2051-6347 CODEN MHAOAL 12(19) 7621–8218 (2025)



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See Yundai Chen, Meng Su, Nan Cheng *et al.*, pp. 7914–7923. Image reproduced by permission of Nan Cheng from *Mater. Horiz.*, 2025, 12, 7914.



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See Klaus Meerholz, Daniele Fazzi *et al.*, pp. 7924–7936. Image reproduced by permission of Robert Herzhoff from *Mater. Horiz.*, 2025, 12, 7924.

EDITORIAL

7634

Materials Horizons Emerging Investigator Series:
Professor Chris Bartel, University of Minnesota, USA

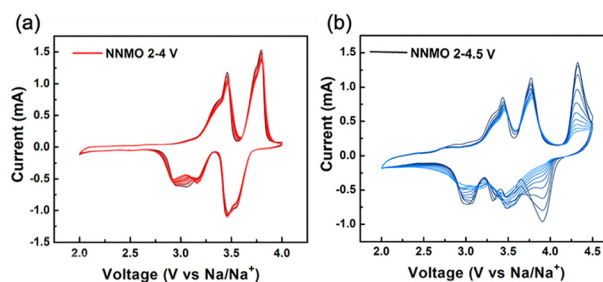


OPINION

7636

Mitigating the P2–O2 phase transition-induced structural instability in P2-Na_x[Ni_{1/3}Mn_{2/3}]O₂ Na-ion battery cathodes: to dope or not to dope, that is the question

Mohamed H. Hassan, Jintao Fu, Jiaxin Liu and Eric Detsi*



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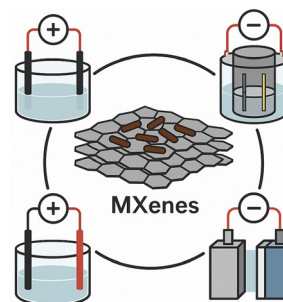


REVIEWS

7648

MXene-based electrocatalysts for CO₂ reduction: advances, challenges, and perspectives

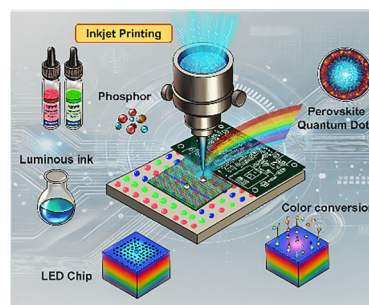
Sawsan Abo Talas, Pewee D Kolubah, Rushana Khairova, Manal Alqahtani, Soliman I. El-Hout, Faisal M. Alissa, Jehad K. El-Demellawi, Pedro Castaño* and Hend Omar Mohamed*



7683

Emerging strategies for inkjet-printed perovskite quantum dots in high-performance LED displays

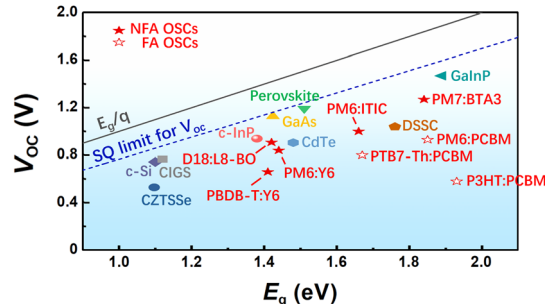
Loan Thi Ngo, Yen-Huei Lin and Ru-Shi Liu*



7714

Charge carrier recombination and voltage losses in organic solar cells

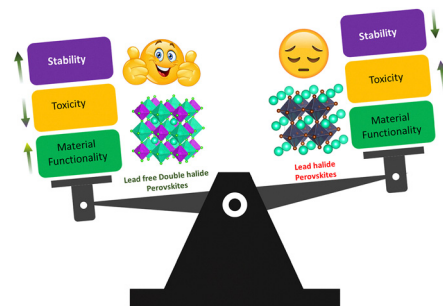
Yi Lin, Zaifei Ma* and Zheng Tang*



7749

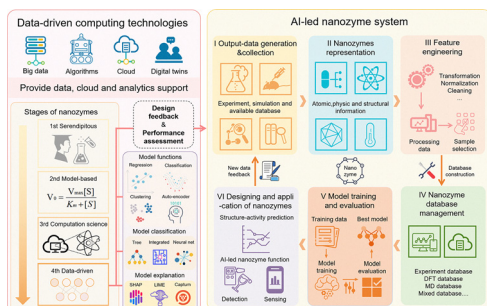
From optoelectronics to scintillation applications: the versatility of lead-free halide double perovskites

Astakala Anil Kumar and Nohyun Lee*



REVIEWS

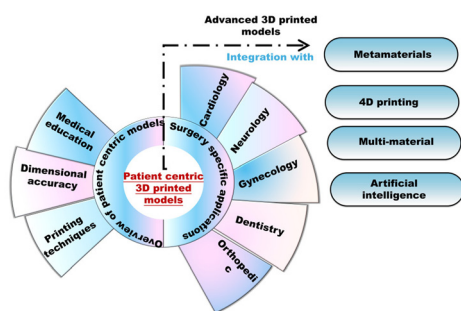
7779



Artificial intelligence-driven revolution in nanozyme design: from serendipity to rational engineering

Yixin Yu, Mingzhen Zhang* and Kelong Fan*

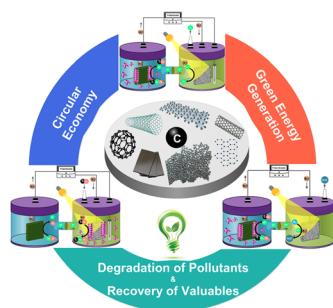
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Transforming surgical planning and procedures through the synergistic use of additive manufacturing, advanced materials and artificial intelligence: challenges and opportunities

Shivi Tripathi, Aftab Alam Ansari, Manisha Singh, Madhusmita Dash, Prasoon Kumar,* Harpreet Singh, Biranchi Panda, Syam Nukavarapu, Gulden Camci-Unal, Bingbing Li, Prashant Kumar Jain, Rengaswamy Jayaganthan, Hassan Mehboob, Harri Junaedi, Himansu Sekhar Nanda,* Guoping Chen and Subhas C. Kundu

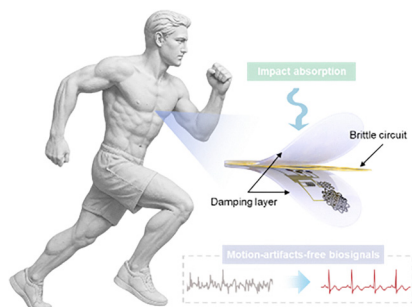
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Carbon-based electrodes for photo-bio-electrocatalytic microbial fuel and electrolysis cells: advances and perspectives

Ankita Chaurasiya, Yashmeen Budania, Goldy Shah, Aradhana Mishra and Shiv Singh*

7894



Selectively damping materials for next-generation motion-artifact-free skin-interfaced soft bioelectronics

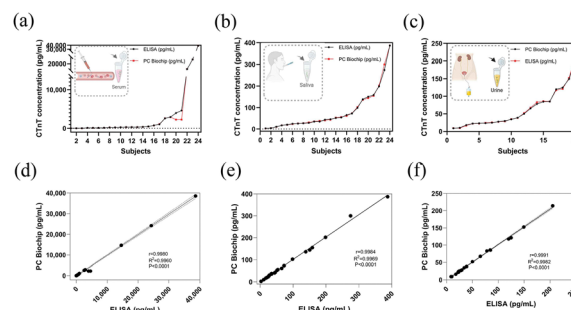
Zehua Chen, Feng Zhang, Xiaoyan Qian, Ganggang Zhao and Zheng Yan*



7914

Cardiac troponin detection in one drop of saliva or urine for 10-minute assessment of acute myocardial infarction

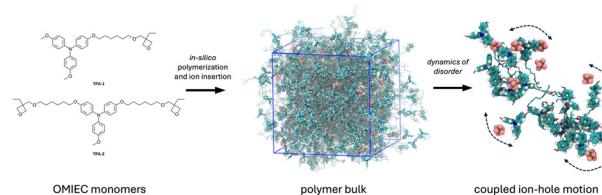
Xuelian Wu, Zewei Lian, Zhiyu Tan, Yaqun Yu, Tong Ren, Hua Shen, Jie Zhang, Shengli Jiang, Yundai Chen,* Meng Su* and Nan Cheng*



7924

Dynamics of disorder in mixed ionic–electronic transport in cross-linked non-conjugated redox polymers

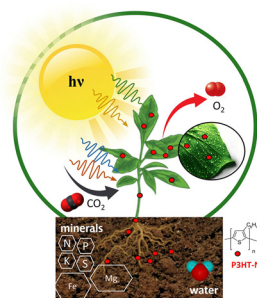
Robert Herzhoff, Laura Plein, Alessandro Troisi, Klaus Meerholz* and Daniele Fazzi*



7937

Conjugated polymer nanoparticles boosting growth and photosynthesis in biohybrid plants

Manuela Ciocca,* Mauro Maver, Ciro Allarà, Damiano Zanotelli, Soufiane Krik, Antonio Orlando, Thilo Rühle, Sabrina Walz, Theo Figueroa Gonzalez, Giovanna Gentile, Alexandros A. Lavdas, Pietro Ibba, Fabio Trevisan, Zygmunt Milosz, Melanie Timpel, Marco V. Nardi, Andrea Pedrielli, Andrea Gaiardo, Paolo Lugli, Franco Cacialli, Dario Leister, Tanja Mimmo and Luisa Petti



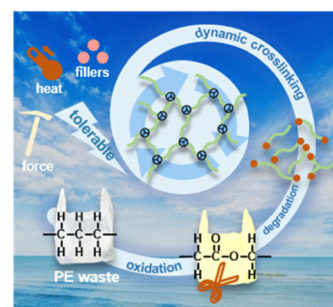
Conjugated Polymer Nanoparticles for Enhanced Bio-hybrid plants.

- 45% increase in root length
- up to 17% biomass production
- 11% increased net CO₂ assimilation

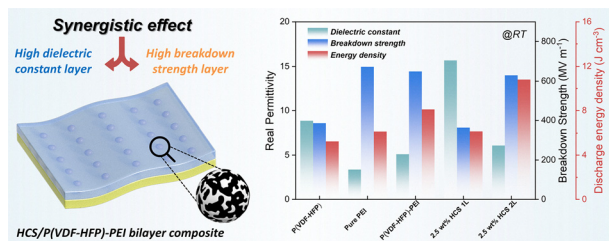
7951

Oxidation upcycling of polyethylene into degradable, recyclable and high-performance materials

Chengfeng Shen, Xiangyue Wei, Qiang Zhang, Pengbo Ye, Xuehui Liu, Shimei Xu* and Yu-Zhong Wang*



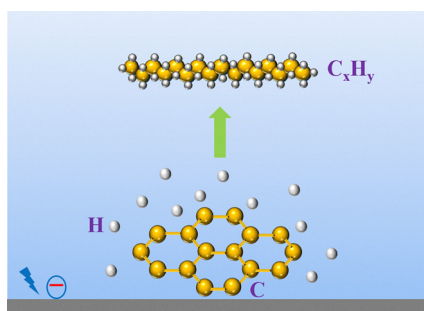
7959



Significant dielectric energy storage enhancement in layered polymer films with heterogeneous carbon/silica nanospheres

Peng Yin, Kun Pang, Qingyang Tang, Shuimiao Xia, Davoud Dastan and Zhicheng Shi*

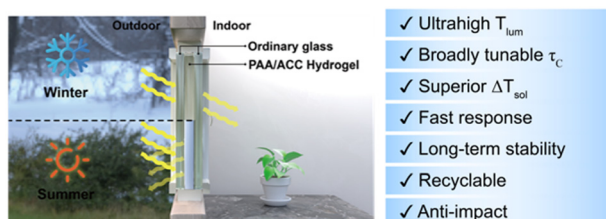
7969



Electrosynthesis of high carbon chemicals from carbon paper

Hongyuan Chuai

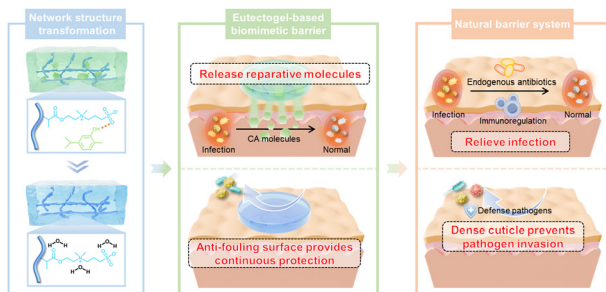
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Multi-scale structural engineering enables thermochromic organic-inorganic hydrogels for robust smart windows

Wanlin Wu, Canhui Lu,* Helmut Cölfen and Rui Xiong*

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Eutectogel-based biomimetic barrier with network-structure-transformation-activated defensive and reparative functions for infected wounds

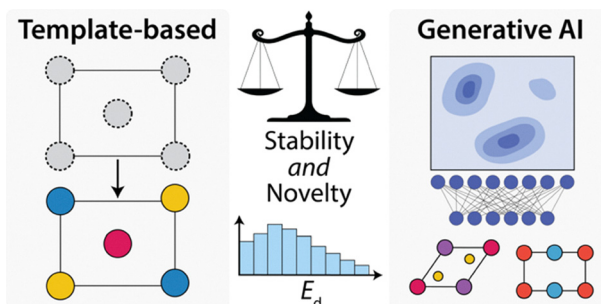
Hui Sun, Jing Cheng, Xu Peng, Mengyan Kang, Ao Gao, Jun Luo, Xinyuan Xu* and Jianshu Li*



8000

Establishing baselines for generative discovery of inorganic crystals

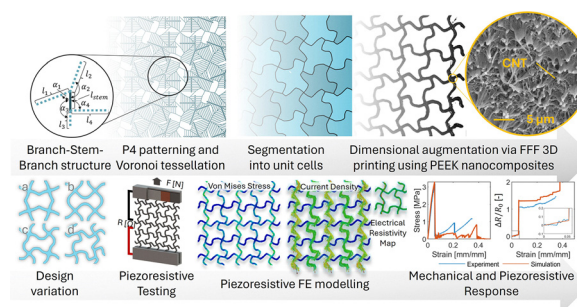
Nathan J. Szymanski and Christopher J. Bartel*



8012

Topology-engineered piezoresistive lattices with programmable strain sensing, auxeticity, and failure modes

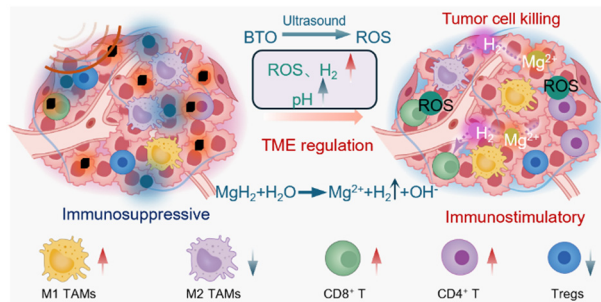
Johannes Schneider, Mattia Utzeri, V. R. Krishnamurthy, E. Akleman and S. Kumar*



8033

Magnesium hydride-induced hydrogen therapy for enhanced sonodynamic therapy

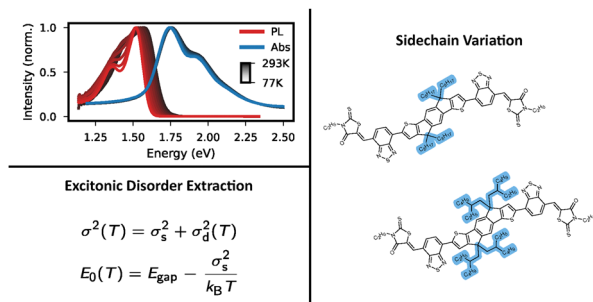
Jing Huang, Jianping Meng, Yijie Fan, Engui Wang, Xiangxiang Wang, Huirun Fan, Dan Luo, Lingling Xu* and Zhou Li*



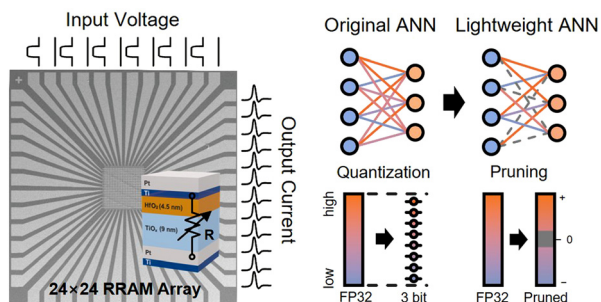
8048

Extracting disorder parameters from optical spectra of non-fullerene acceptors

Siebe Frederix*, Samuele Giannini, Melissa Van Landeghem, David Beljonne and Koen Vandewal*



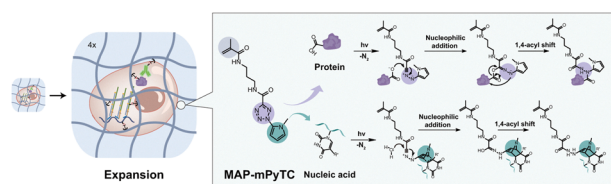
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Implementation of ultra-low-power neural networks on quantized and pruned RRAM crossbar arrays

Hyoseob Kim, Kyungho Hong, Sungjoon Kim, Woo Young Choi* and Min-Hwi Kim*

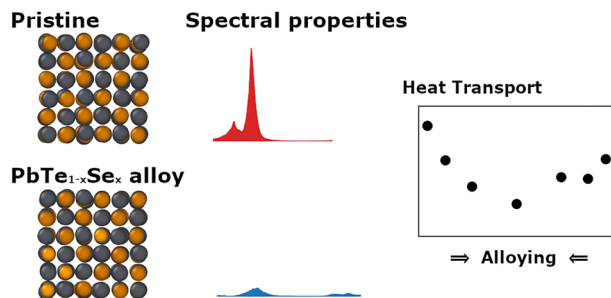
8072



Super-resolution co-imaging of proteins and nucleic acids on expansion microscopy

Ziqing Yuan, Jiasu Xu, Luyao Li, Hongxia Li, Jie He, Kaiwen Bao, Lai Jiang, Guangxia Shen* and Xianting Ding*

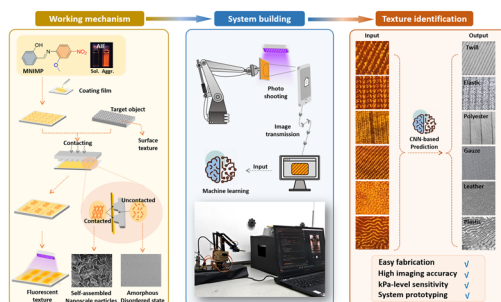
8084



Heat transport properties of PbTe_{1-x}Se_x alloys using equivariant graph neural network interatomic potential

Kevin Conley,* Colton Gerber, Andrew Novick, Terra Berriodi, Eric S. Toberer and Antti J. Karttunen*

8095



An intelligent tactile imaging-recognition sensor system enabled via a methoxynitrobenzene-salicylaldehyde fluorescent material

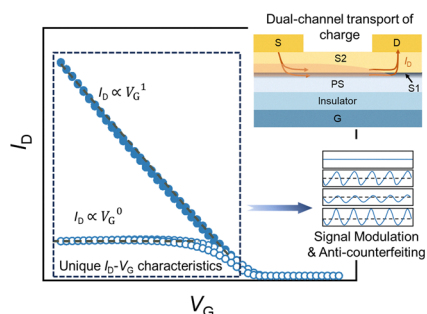
Zihan Liu, Xinyi Zhao, Yuai Duan, Yaping Li, Zhijia Wang, Zixuan Wang, Jiarong Zhang, Jing Yuan, Hua Geng and Tianyu Han*



8110

Organic dual-channel transistors for reconfigurable signal modulation and anti-counterfeiting

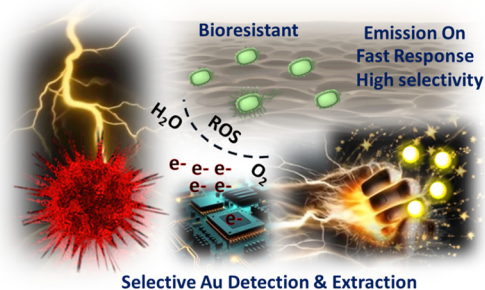
Qingyu Wang, Peng Wei,* Nan Qiao, Xin Wang, Guanyu Lu, Guanghao Lu,* Laju Bu and Shengtao Li



8122

Enhanced photocatalytic gold recovery with concurrent near-IR fluorescence turn-on sensing: N,S-doped CDs in functionalized dendritic silica as a dual-mode platform

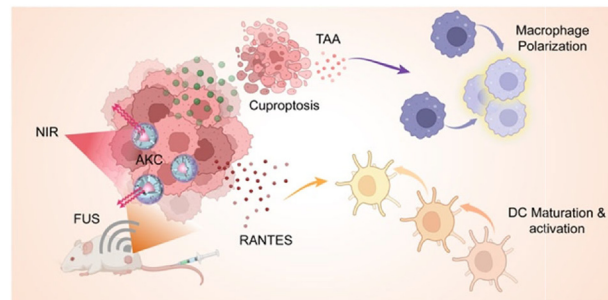
Sanjay Yadav,* Nishu Choudhary, Vasavdutta Sonpal and Alok Ranjan Paital*



8134

Focused ultrasound-responsive artificial killer cells for enhanced closed-loop cancer immunotherapy

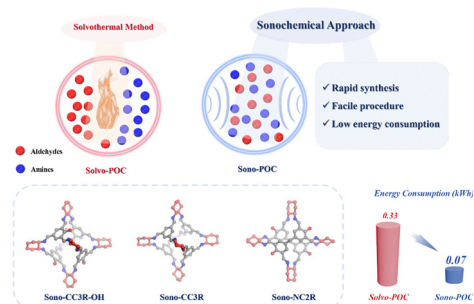
Jieying Zhang, Pengrui Wang, Lingkai Meng, Xiaohe Li, Fang Li, Na Kong and Xingjun Zhu*



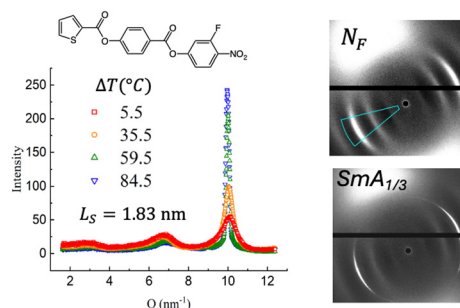
8147

Ultrafast sonochemical synthesis of imine-linked porous organic cages with high surface area for gas adsorption

Yilian Liu, Zhaoqin Han, Mao Yi, Zhiyuan Zhang, Zifeng You, Xiongli Liu,* Qiao Zhao* and Baiyan Li



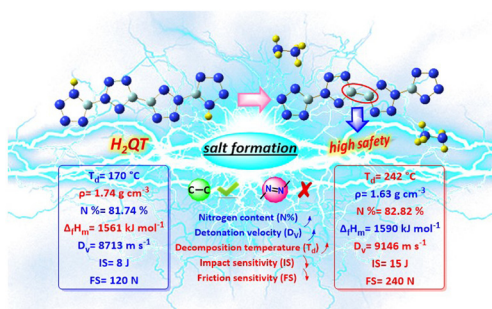
8153



Ferroelectric nematic and smectic liquid crystals with sub-molecular spatial correlations

Parikshit Guragain, Arjun Ghimire, Manisha Badu, Netra Prasad Dhakal, Pawan Nepal, James T. Gleeson, Samuel Sprunt,* Robert J. Twieg* and Antal Jáklí*

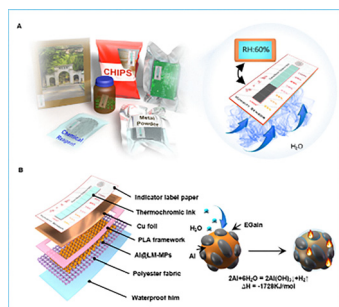
8165



Direct C–C linkage coupled with salt formation: a dual strategy for high-performance tetrazole-based energetic materials

Xuezhi Yu, Caijin Lei, Ziyi Xu, Chungui Xue, Jie Tang,* Hongwei Yang,* Chuan Xiao* and Guangbin Cheng*

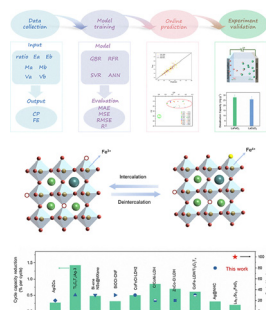
8172



Liquid metal microparticles enabled low-cost, compact, and sensitive humidity sensors for *in situ* moisture monitoring

Xuanhan Chen, Hao Lin, Xiaoqi Gao, Yuguo Deng, Xiaoqin Sun, Mingyuan Sun, Long Wang, Liang Quan, Wanlin Bao, Weihua Li, Lining Sun, Hao Yang,* Shiwu Zhang,* Shi-Yang Tang* and Xiangpeng Li*

8181



Chloride ion-capturing La_{0.7}Sr_{0.3}BO₃ (B = Fe, Co) perovskite oxides achieving superior electrochemical desalination performance

Fanyue Meng, Hao Wang, Xiaoyang Xuan, Yong Liu,* Yuquan Li, Xingtao Xu* and Likun Pan*

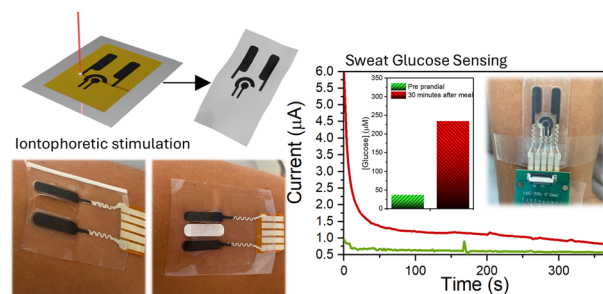


COMMUNICATIONS

8194

Integrated iontophoresis and sweat sensing via paper-derived laser-induced graphene soft conductors

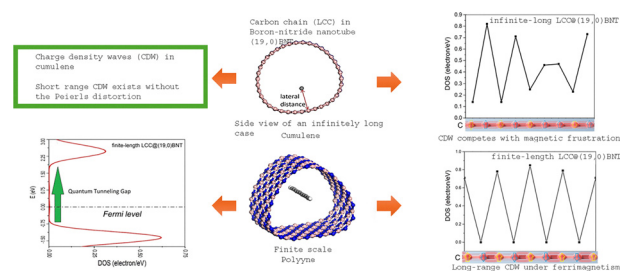
Tomás Pinheiro,* Henrique Vazão de Almeida, Daniela Nunes, Rodrigo Martins and Elvira Fortunato*



8205

Tuning charge density waves and magnetic switching in carbon nanowires encased in boron nitride nanotubes

Chi Ho Wong,* Zongliang Guo, King Cheong Lam, Chun Pong Chau, Wing Yu Chan, Chak-yin Tang, Yuen Hong Tsang, Leung Yuk Frank Lam and Xijun Hu



RETRACTION

8216

Retraction: Unity photoluminescence quantum yield and superior stability achieved in lanthanide-doped lead-free $\text{Cs}_2\text{NaNCl}_6$ double perovskites for highly efficient light emitting diodes

Hamza Shaili, Tae Kyong John Kim and Clemens Burda*

