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Materials Horizons

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See Chih-Yu Chang *et al.*, pp. 646–660. Image reproduced by permission of Chih-Yu Chang from *Mater. Horiz.*, 2024, **11**, 646.

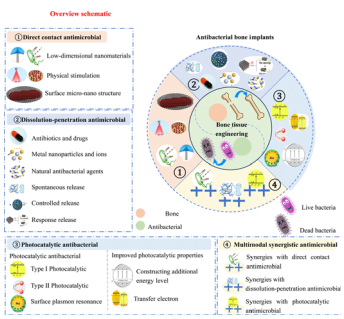
Inside cover
See Sujoy K. Das *et al.*, pp. 661–679. Image reproduced by permission of Sujoy K. Das from *Mater. Horiz.*, 2024, **11**, 661.

REVIEWS

590

Construction of antibacterial bone implants and their application in bone regeneration

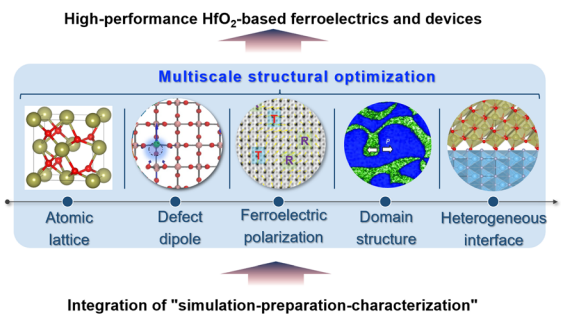
Pei Feng, Ruizhong He, Yulong Gu, Feng Yang, Hao Pan* and Cijun Shuai*



626

Recent progress on defect-engineering in ferroelectric HfO_2: The next step forward *via* multiscale structural optimization

Fengjun Yan, Yao Wu, Yilong Liu, Pu Ai, Shi Liu, Shiqing Deng, Kan-Hao Xue, Qiuyun Fu and Wen Dong*



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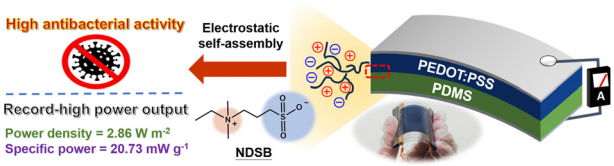
COMMUNICATIONS

646

Facile surface functionalization of triboelectric layers *via* electrostatically self-assembled zwitterionic molecules for achieving efficient and stable antibacterial flexible triboelectric nanogenerators

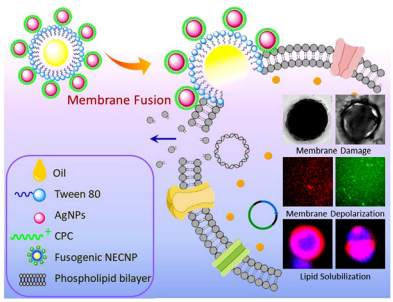
Chih-Yu Chang,* Jia-Ruei Yang, Yi-Shan Liu and Abhisek Panda



661

A membrane targeted multifunctional cationic nanoparticle conjugated fusogenic nanoemulsion (CFusoN): induced membrane depolarization and lipid solubilization to accelerate the killing of *Staphylococcus aureus*

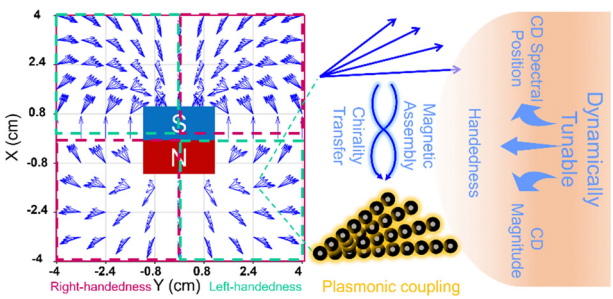
Somashree Bose, Yogita Dahat, Deepak Kumar, Saikat Haldar and Sujoy K. Das*



680

Magnetic assembly of plasmonic chiral superstructures with dynamic chiroptical responses

Chaolumen Wu, Qingsong Fan, Zhiwei Li, Zuyang Ye and Yadong Yin*



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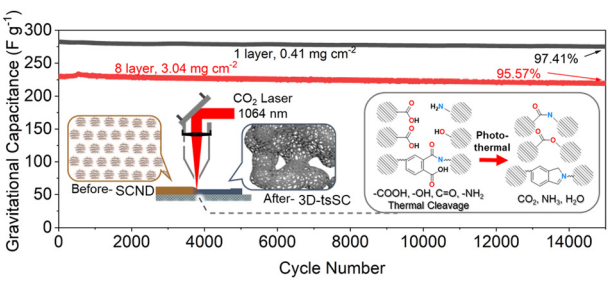
A simple route to functionalized porous carbon foams from carbon nanodots for metal-free pseudocapacitors

Chenxiang Wang, Kimberly Sung, Jason Zi Jie Zhu, Sheng Qu, Jiawei Bao, Xueying Chang, Yuto Katsuyama, Zhiyin Yang, Chonghao Zhang, Ailun Huang, Bradley C. Kroes, Maher F. El-Kady and Richard B. Kaner*



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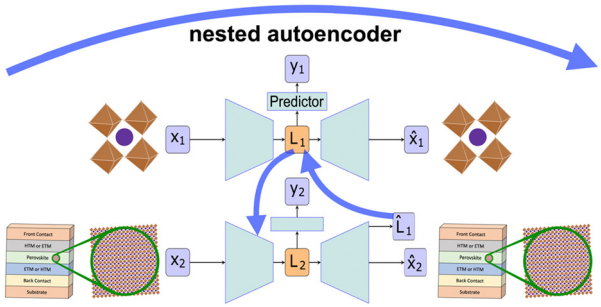
700



NestedAE: interpretable nested autoencoders for multi-scale materials characterization

Nikhil Thota, Maitreyee Sharma Priyadarshini and Rigoberto Hernandez*

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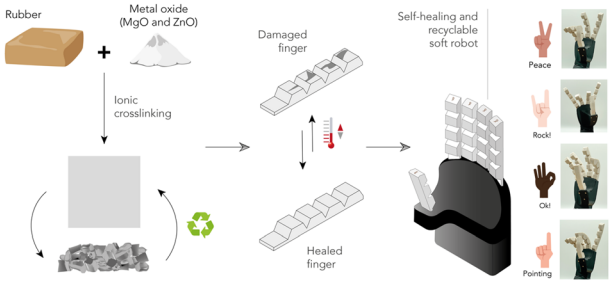

Unlocking the potential of self-healing and recyclable ionic elastomers for soft robotics applications

S. Utrera-Barrios,* N. Steenackers, S. Terryn, P. Ferrentino, R. Verdejo, G. Van Asche, M. A. López-Manchado, J. Brancart and M. Hernández Santana*

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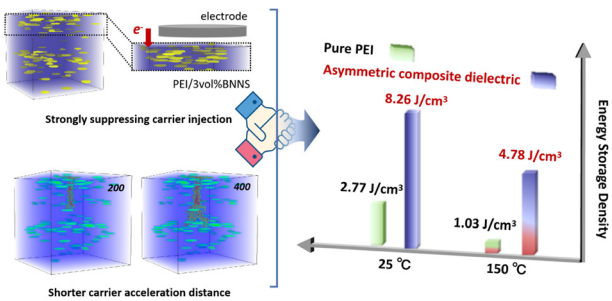

Constructing asymmetric gradient structures to enhance the energy storage performance of PEI-based composite dielectrics

Dong Yue, Wenchao Zhang,* Puzhen Wang, Yong Zhang, Yu Teng, Jinghua Yin and Yu Feng*

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Neuromorphic devices realised using self-forming hierarchical Al and Ag nanostructures: towards energy-efficient and wide ranging synaptic plasticity

Rohit Attri, Indrajit Mondal, Bhupesh Yadav, Giridhar U. Kulkarni* and C. N. R. Rao

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COMMUNICATIONS

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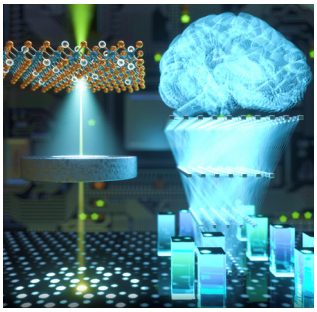
Full automation of point defect detection in transition metal dichalcogenides through a dual mode deep learning algorithm

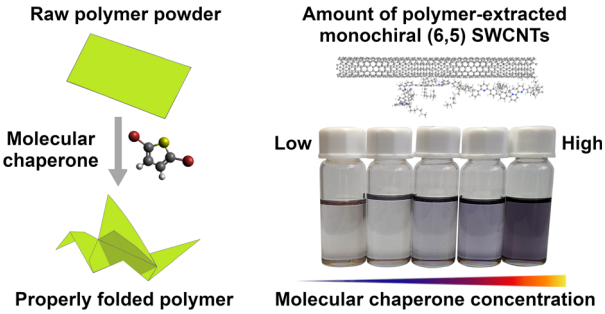
Dong-Hwan Yang, Yu-Seong Chu, Odongo Francis Ngome Okello, Seung-Young Seo, Gunho Moon, Kwang Ho Kim, Moon-Ho Jo, Dongwon Shin, Teruyasu Mizoguchi, Sejung Yang* and Si-Young Choi*



758

High-yield and chirality-selective isolation of single-walled carbon nanotubes using conjugated polymers and small molecular chaperones

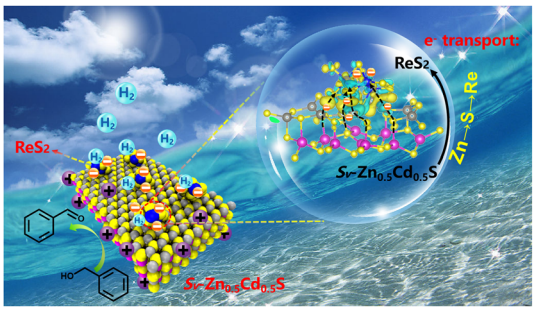
D. Just,* A. Dzienia, K. Z. Milowska, A. Mielańczyk and D. Janas*



768

S-vacancy-assisted fast charge transport and oriented ReS_2 growth in twin crystal $Zn_xCd_{1-x}S$: an atomic-level heterostructure for dual-functional photocatalytic conversion

Guiyang Yu,* Ke Gong,* Xiang Li, Luyang Guo, Xiyou Li and Debao Wang*



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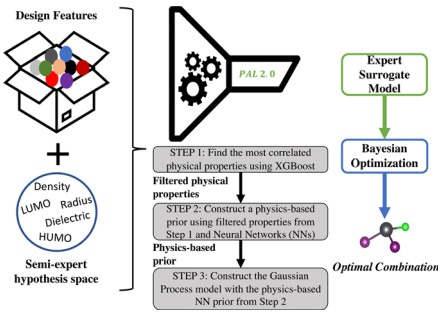
PAL 2.0: a physics-driven bayesian optimization framework for material discovery

Maitreyee Sharma Priyadarshini, Oluwaseun Romiluyi, Yiran Wang, Kumar Miskin, Connor Ganley and Paulette Clancy*



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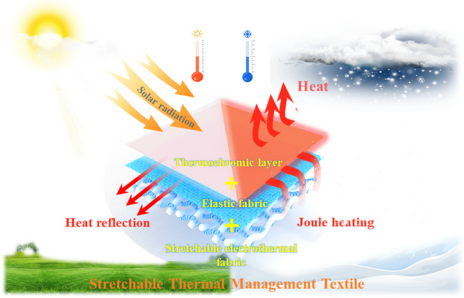
792



Dual-functional thermal management textiles for dynamic temperature regulation based on ultra-stretchable spiral conductive composite yarn with 500%-strain thermal stability and durability

Wei Chen, Xiaoxiao Wei, Wei Liu and Fujun Xu*

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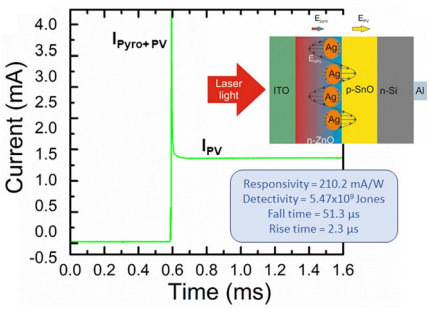

High-performance and self-powered visible light photodetector using multiple coupled synergetic effects

José P. B. Silva,* Eliana M. F. Vieira, Katarzyna Gwozdz, Nuno E. Silva, Adrian Kaim, Marian C. Istrate, Corneliu Ghica, José H. Correia, Mario Pereira, Luís Marques, Judith L. MacManus-Driscoll,* Robert L. Z. Hoye and Maria J. M. Gomes

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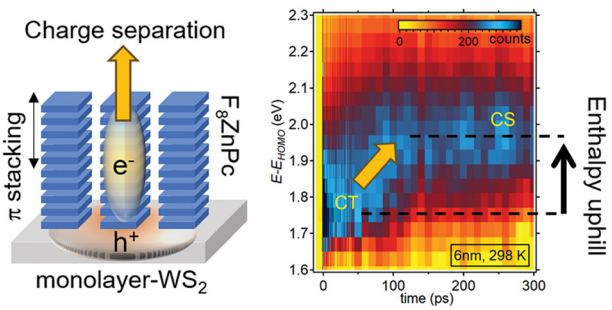

Enthalpy-uphill exciton dissociation in organic/2D heterostructures promotes free carrier generation

Fatimah Rudayni, Kushal Rijal, Neno Fuller and Wai-Lun Chan*

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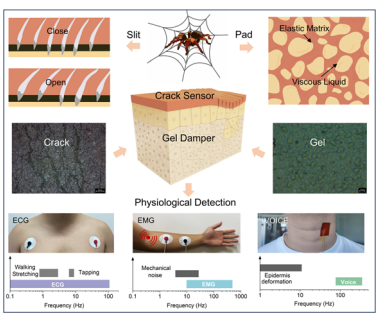

Physiological sensing system integrated with vibration sensor and frequency gel dampers inspired by spider

Jianren Huang, Anbang Chen, Jinrong Liao, Songjiu Han, Qirui Wu, Jiayu Zhang, Yujia Chen, Xiandong Lin and Lunhui Guan*

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COMMUNICATIONS

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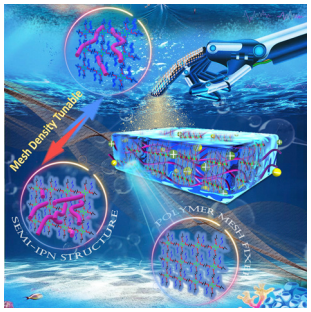
A "Mesh Scaffold" that regulates the mechanical properties and restricts the phase transition-induced volume change of the PNIPAM-based hydrogel for wearable sensors

Xiaoyong Zhang,* Haoran Ding, Zhaozhao Li, Yongping Bai and Lidong Zhang*



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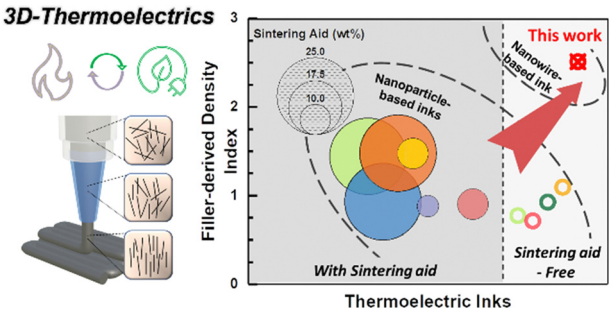
Thermoelectric nanowires for dense 3D printed architectures

Danwei Zhang,* Jayanthi Ramiah, Mehmet Cagirici, Kivanc Saglik, Samantha Faye Duran Solco, Jing Cao,* Jianwei Xu* and Ady Suwardi*



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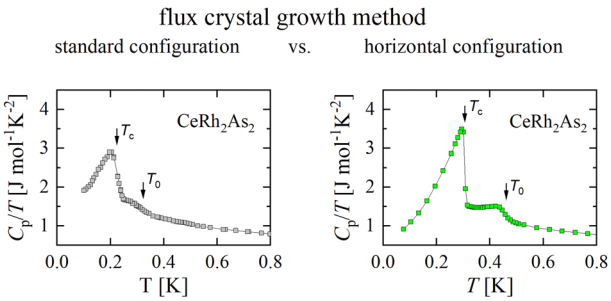
Horizontal flux growth as an efficient preparation method of $CeRh_2As_2$ single crystals

Grzegorz Chajewski,* Damian Szymański, Marek Daszkiewicz and Dariusz Kaczorowski



CORRECTION

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Correction: Superprotonic conductivity in $RbH_{2-3y}(PO_4)_{1-y}$: a phosphate deficient analog to cubic CsH_2PO_4 in the $(1-x)RbH_2PO_4 - xRb_2HPO_4$ system

Grace Xiong, Louis S. Wang and Sossina M. Haile*