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Materials Horizons

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See Naresh C. Osti, Niina Jalarvo, Eugene Mamontov, pp. 4535–4572. Image reproduced by permission of Phoenix Pleasant (graphic artist) and Oak Ridge National Laboratory from *Mater. Horiz.*, 2024, **11**, 4535.

Inside cover
See Eunho Lee *et al.*, pp. 4638–4650. Image reproduced by permission of Eunho Lee from *Mater. Horiz.*, 2024, **11**, 4638.

EDITORIAL

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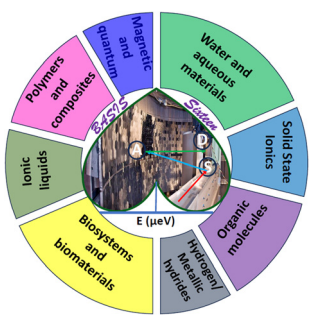
***Materials Horizons* Emerging Investigator Series: Dr Mateusz Odziomek, Max Planck Institute of Colloids and Interfaces, Germany**

REVIEWS

4535

Backscattering silicon spectrometer (BASIS): sixteen years in advanced materials characterization

Naresh C. Osti,* Niina Jalarvo* and Eugene Mamontov*



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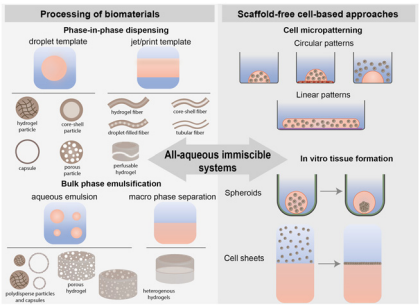
REVIEWS

4573

Exploring the potential of all-aqueous immiscible systems for preparing complex biomaterials and cellular constructs

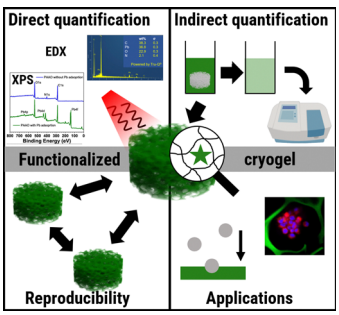
Raquel C. Gonçalves, Mariana B. Oliveira* and João F. Mano*



4600

Surface functionalized cryogels – characterization methods, recent progress in preparation and application

Florian Behrendt,* Michael Gottschaldt and Ulrich S. Schubert

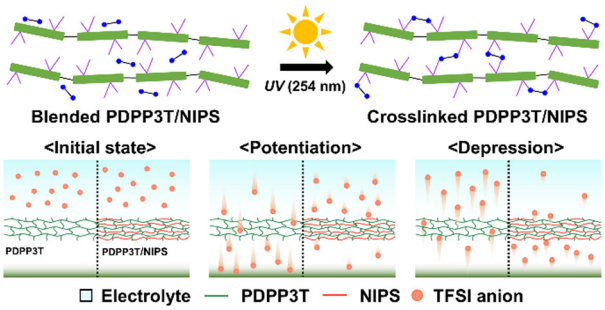


COMMUNICATIONS

4638

Crosslinking-induced anion transport control for enhancing linearity in organic synaptic devices

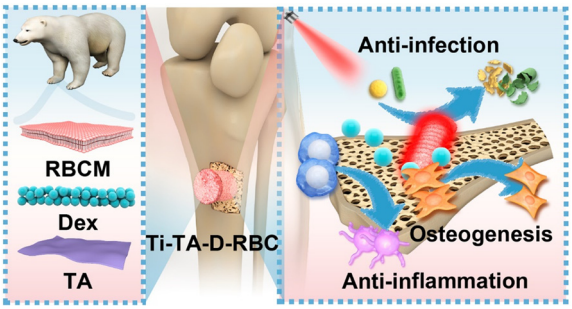
Hyoik Jang, Geun Yeol Bae, Seung Hyun Kim, Junho Sung and Eunho Lee*



4651

Thermal control of photothermal implants inspired by polar bear skin for the treatment of infected bone defects

Mingyue Han, Xinlong Li, Shijie Shi, Ailin Hou, Han Yin, Lizhong Sun, Jianshu Li, Jun Luo, Jiyao Li* and Jiaojiao Yang*



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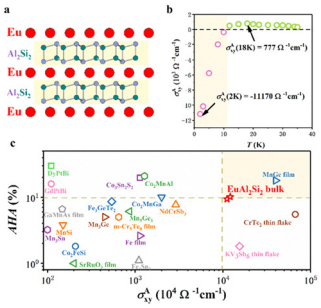
COMMUNICATIONS

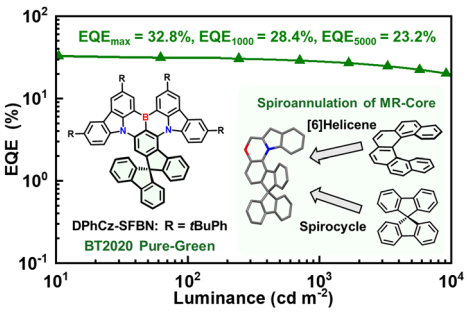
4665



Colossal anomalous Hall effect in the layered antiferromagnetic $EuAl_2Si_2$ compound

Jie Chen, Xiuxian Yang, Feng Zhou, Yong-Chang Lau, Wanxiang Feng, Yugui Yao, Yue Li, Yong Jiang and Wenhong Wang*

4674



Spirobifluorene-fused strategy enables pure-green multiple resonance emitters with low efficiency roll-off

Hu Cheng, Jingbo Lan,* Yudong Yang and Zhengyang Bin*

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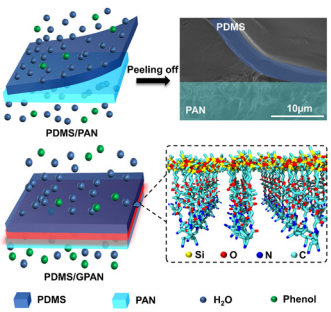

Design of PDMS/PAN composite membranes with ultra-interfacial stability *via* layer integration

Chao Sang, Siyuan Zhang, Zhihao Si,* Qinxu Li, Hanzhu Wu, Lankun Wang, Shilong Dong, Jan Baeyens, Peng-Fei Cao* and Peiyong Qin*

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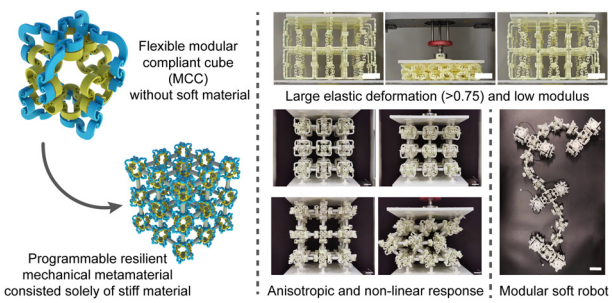

Programmable and resilient metamaterials with anisotropic and non-linear mechanical responses composed exclusively of stiff constituents

Hongyi Yao, Xiaoyu Zhao, Kaiwen Shi, Wei Sun and Shengli Mi*

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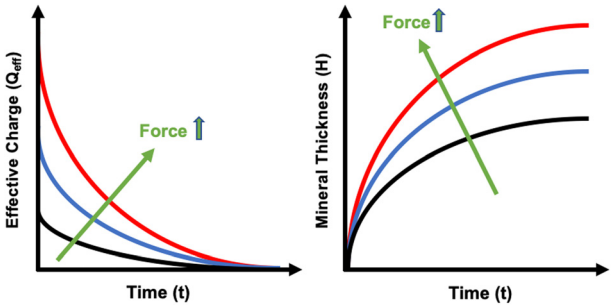
COMMUNICATIONS

4705

Self-limiting material growth triggered and tunable by force through piezocharge-induced mineralization

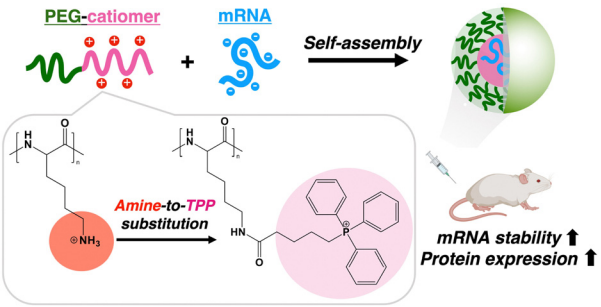
Grant Kitchen, Bohan Sun, Mostafa M. Omar, Adebayo Eisape and Sung Hoon Kang*



4711

Triphenylphosphonium-modified catiomers enhance *in vivo* mRNA delivery through stabilized polyion complexation

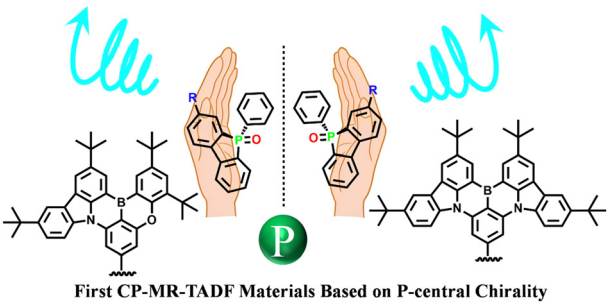
Jumpei Norimatsu, Hayato L. Mizuno, Takayoshi Watanabe, Takumi Obara, Makoto Nakakido, Kouhei Tsumoto, Horacio Cabral,* Daisuke Kuroda* and Yasutaka Anraku*



4722

Multiple-resonance thermally activated delayed fluorescence materials based on phosphorus central chirality for efficient circularly polarized electroluminescence

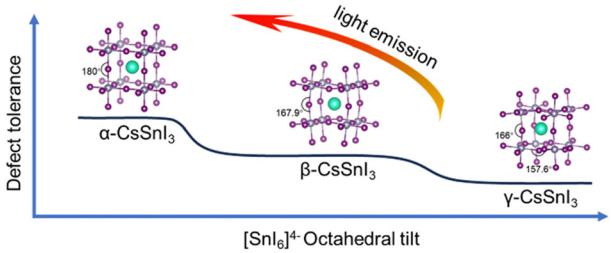
Yu Wang, Zi-Yi Lv, Zi-Xuan Chen, Shuai Xing, Zhong-Zhong Huo, Xian-Fang Hong, Li Yuan, Wei Li and You-Xuan Zheng*



4730

High defect tolerance β-$CsSnI_3$ perovskite light-emitting diodes

Haixuan Yu, Tao Zhang, Zhiguo Zhang, Zhirong Liu, Qiang Sun, Junyi Huang, Letian Dai, Yan Shen, Xiongjie Li* and Mingkui Wang*



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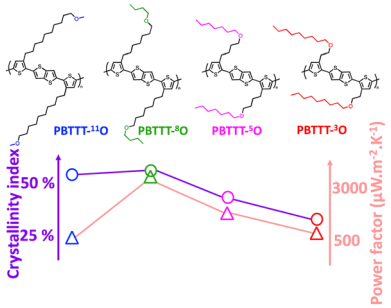
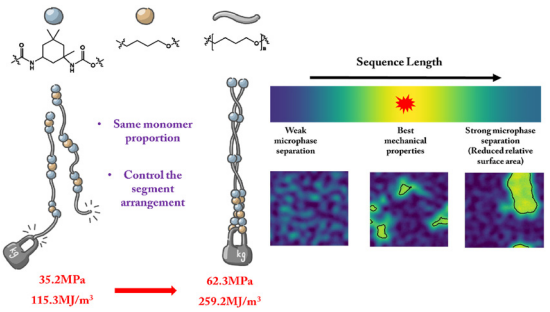


Controlling conjugated polymer morphology by precise oxygen position in single-ether side chains

Pablo Durand, Huiyan Zeng, Badr Jismy, Olivier Boyron, Benoît Heinrich, Laurent Herrmann, Olivier Bardagot,* Ioannis Moutsios, Alina V. Mariasevskaia, Alexey P. Melnikov, Dimitri A. Ivanov, Martin Brinkmann* and Nicolas Leclerc*

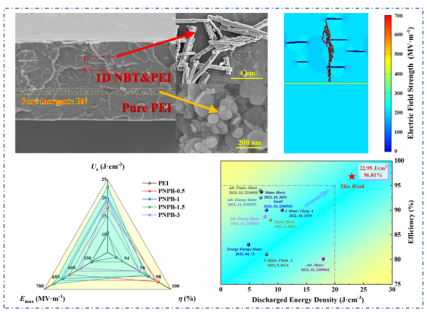
4747



Filler effects inspired high performance polyurethane elastomer design: segment arrangement control

Jiaxin Shi, Tianze Zheng, Zhiqi Wang, Pujin Wang, Hongkun Yang, Jinjing Guo, Dong Wang, Baohua Guo and Jun Xu*

4759



Synergistically enhanced discharged energy density and efficiency achieved in designed polyetherimide-based composites *via* asymmetrical interlayer structure induced optimized interface effectiveness

Yongjing Zhang, Ying Lin,* Yanlong Ma, Qibin Yuan* and Haibo Yang*

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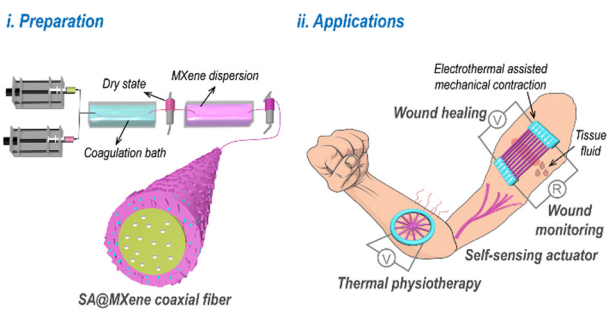

Sodium alginate-based coaxial fibers synergistically integrate moisture actuation, length tracing, humidity sensing, and electric heating

Lizhong Dong, Ming Ren, Yulian Wang, Xiaojie Yuan, Xiaobo Wang, Guang Yang, Yuxin Li, Wei Li, Yunfeng Shao, Guanlong Qiao, Weiwei Li, Hongli Sun, Jiangtao Di* and Qingwen Li

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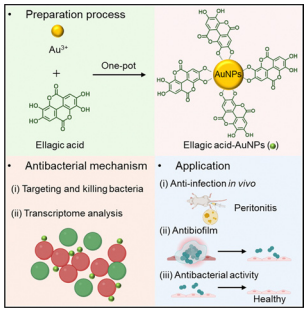
Ellagic acid-modified gold nanoparticles to combat multi-drug resistant bacterial infections *in vitro* and *in vivo*

Yaran Wang, Fan Wu, Yuanfeng Li,* Siran Wang, Yijin Ren, Linqi Shi,* Henny C. van der Mei* and Yong Liu*



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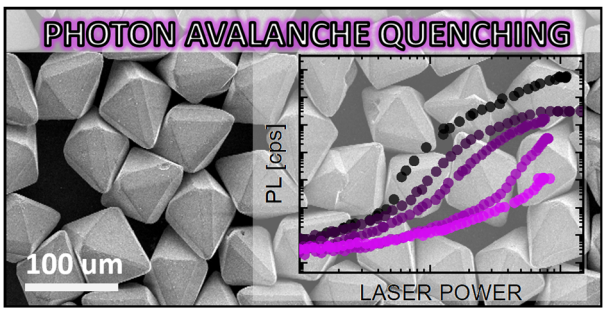
The mechanisms behind the extreme susceptibility of photon avalanche emission to quenching

Martyna Majak,* Małgorzata Misiak and Artur Bednarkiewicz*



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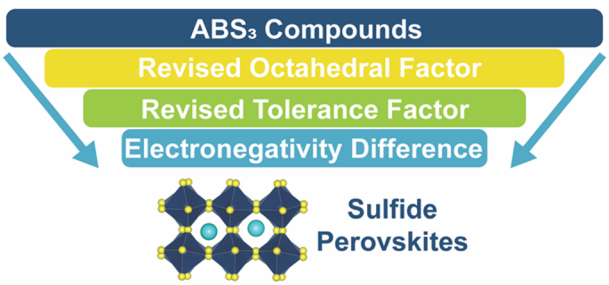
Rethinking tolerance factor analysis for chalcogenide perovskites

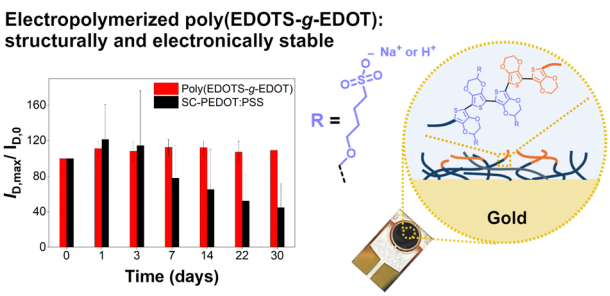
Jonathan W. Turnley, Shubhanshu Agarwal and Rakesh Agrawal*



4809

A PEDOT based graft copolymer with enhanced electronic stability

Modi Gu, Lorenzo Travaglini, Daniel Ta, Jonathan Hopkins, Antonio Lauto, Pawel Wagner, Klaudia Wagner, David L. Officer and Damia Mawad*



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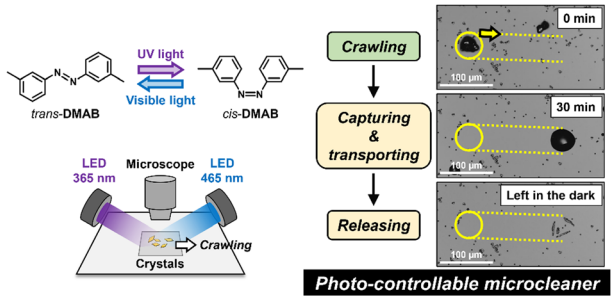

Photo-controllable microcleaner: photo-induced crawling motion and particle transport of azobenzene crystals on a liquid-like surface

Makoto Saikawa, Mio Ohnuma, Kengo Manabe, Koichiro Saito, Yoshihiro Kikkawa and Yasuo Norikane*

CORRECTION

4828

Correction: Performance of ferrite nanoparticles in inductive heating swing adsorption (IHSA): how tailoring material properties can circumvent the design limitations of a system

Maxim De Belder, Alysson F. Morais, Natan De Vos, Sergey Basov, Rikkie Joris, Margriet J. Van Bael, Luc Van Meervelt, Joeri F. M. Denayer, Johan A. Martens and Eric Breynaert*

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