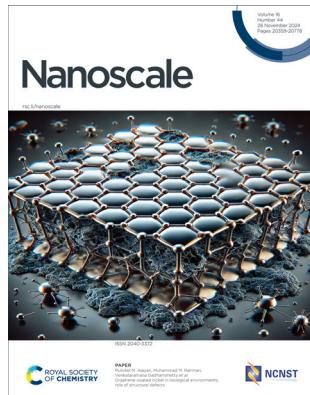


## IN THIS ISSUE

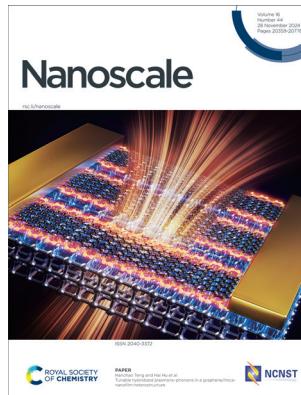
ISSN 2040-3372 CODEN NANOHL 16(44) 20359–20778 (2024)



### Cover

See Pulickel M. Ajayan,  
Muhammad M. Rahman,  
Venkataramana  
Gadhamshetty et al.,  
pp. 20510–20521.

Image reproduced  
by permission of  
Venkataramana  
Gadhamshetty  
from *Nanoscale*,  
2024, **16**, 20510.



### Inside cover

See Hanchao Teng  
and Hai Hu et al.,  
pp. 20522–20531.

Image reproduced  
by permission of  
Hai Hu from *Nanoscale*,  
2024, **16**, 20522.

## EDITORIAL

20372

### Introduction to celebrating the 10th anniversary of INST Mohali

Amitava Patra and Umesh Waghmare

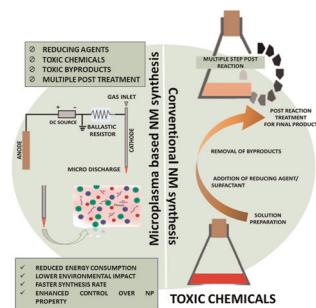


## REVIEWS

20374

### Perspectives on sustainable and efficient routes of nanoparticle synthesis: an exhaustive review on conventional and microplasma-assisted techniques

Khushboo Shah, Jenish Patel, Sanjeev Kumar,  
Ratnesh Pandey, Gurupada Maity and Santosh Dubey\*



# Environmental Science journals

One impactful portfolio for  
every exceptional mind

Harnessing the power of interdisciplinary  
science to preserve our environment

[rsc.li/envsci](http://rsc.li/envsci)

Fundamental questions  
Elemental answers



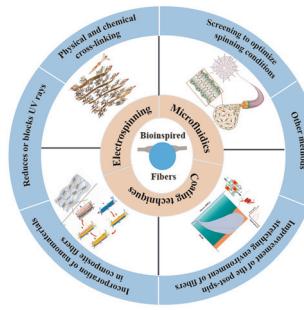
Registered charity number: 207890

## REVIEWS

20405

**Durability improvement strategies for wettable fog harvesting devices inspired by spider silk fibers: a review**

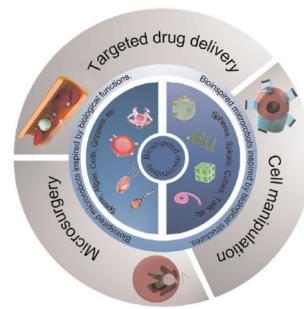
Qiong Wang and Zhiguang Guo\*



20434

**Bioinspired microrobots and their biomedical applications**

Ke Xu,\* Gaolong Yuan, Jianchen Zheng, Yuzhao Zhang, Jingang Wang and Hongji Guo\*

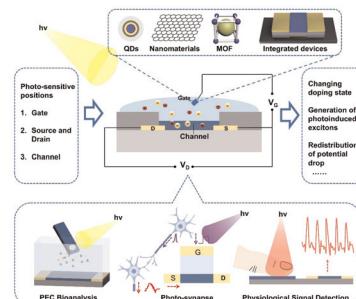


## MINIREVIEWS

20451

**Photoelectrochemical transistors based on semiconducting polymers: an emerging technology for future bioelectronics**

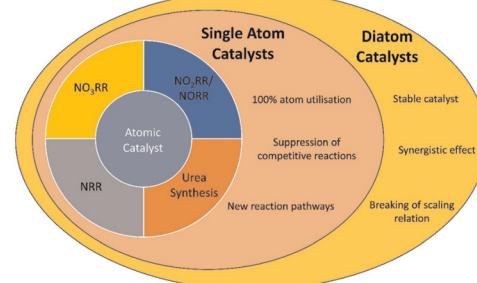
Qingqing Jin, Jinyao Wang, Miao Cheng, Yue Tian, Yifan Xie, Junyang Deng, Hongmei Xiao, Hanlin Wang, Zhenjie Ni, Mengmeng Li\* and Ling Li\*



20463

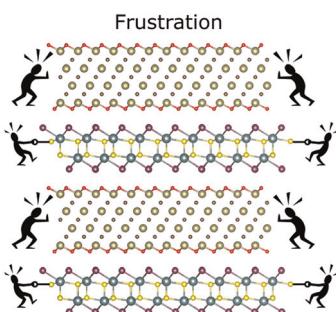
**Single and dual-atom catalysts towards electrosynthesis of ammonia and urea: a review**

Wenyu Luo, Jiawei Liu, Yue Hu and Qingyu Yan\*



## COMMUNICATIONS

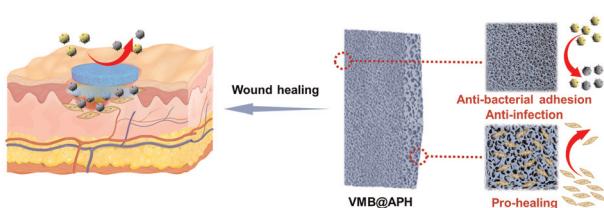
20484



## Frustrated van der Waals heterostructures

Sherif Abdulkader Tawfik

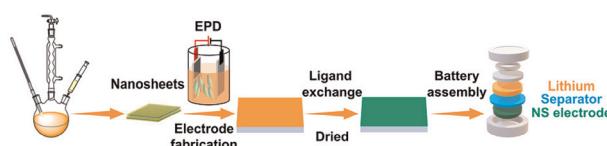
20489



## Asymmetric porous hydrogel encapsulating vulcanized molecular brushes with anti-bacterial adhesion, anti-infection, and pro-healing properties towards infected wound treatment

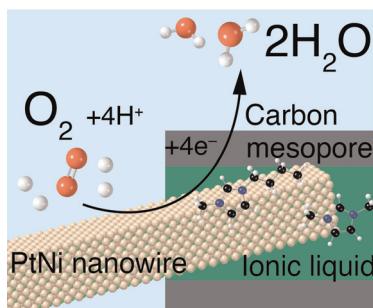
Jinlun Wu, Wenyi He, Ruijun Xu, Yang Li, Dingcai Wu,\* Zifeng Yang\* and Yong Li\*

20496

Electrophoretic assisted fabrication of additive-free WS<sub>2</sub> nanosheet anodes for high energy density lithium-ion batteries

Xuan-Manh Pham, Niraj Nitish Patil, Syed Abdul Ahad, Nilotpal Kapuria, Kwadwo Asare Owusu, Hugh Geaney, Shalini Singh and Kevin M. Ryan\*

20505



## Co-presence of PtNi nanowires and ionic liquid in carbon mesopores enhances electrocatalytic oxygen reduction activity

Yuta Kato, Masaru Kato,\* Shun Saito, Yu Zhuang, Yoshimi Iguchi, Jun Sato, Tasuku Komanoya, Kentaro Soma, Koshiro Suzuki and Ichizo Yagi\*

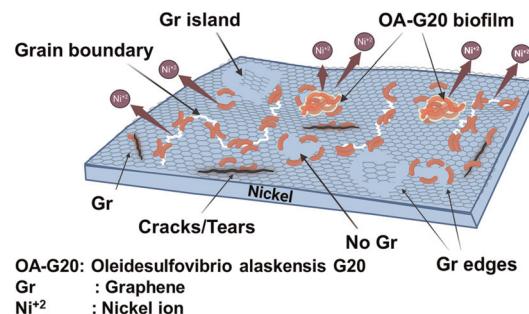


## PAPERS

20510

**Graphene-coated nickel in biological environments: role of structural defects**

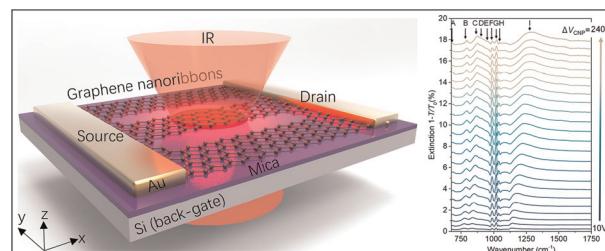
Ramesh Devadig, Pawan Sigdel, Md. Hasan-Ur Rahman, Pulickel M. Ajayan,\* Muhammad M. Rahman\* and Venkataramana Gadhamshetty\*



20522

**Tunable hybridized plasmons–phonons in a graphene/mica-nanofilm heterostructure**

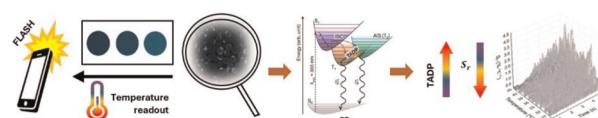
Yaling Qin, Min Liu, Hanchao Teng, Na Chen, Chenchen Wu, Chengyu Jiang, Zhuoxin Xue, Hualong Zhu, Jiayi Gui, Xiang Liu,\* Yuchuan Xiao\* and Hai Hu\*



20532

**Time-gated multi-dimensional luminescence thermometry via carbon dots for precise temperature mobile sensing**

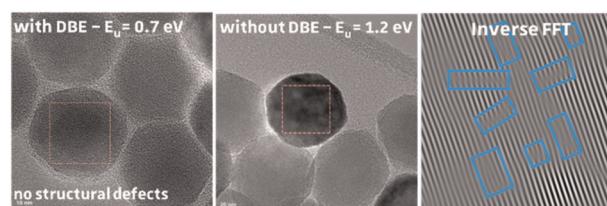
Sílvia F. V. Silva, Gonçalo Figueiredo, Rui F. P. Pereira, Verónica de Zea Bermudez, Lianshe Fu, Paulo S. André, Albano N. Carneiro Neto\* and Rute A. S. Ferreira\*



20542

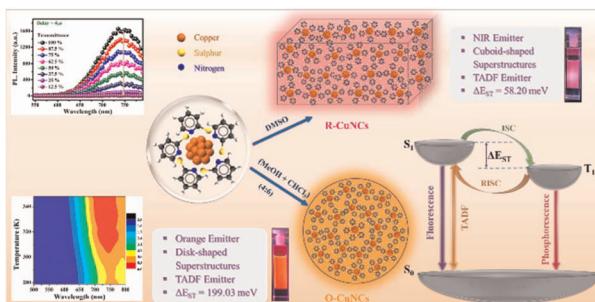
**Defects or no defects? Or how to design 20–25 nm spherical iron oxide nanoparticles to harness both magnetic hyperthermia and photothermia**

Barbara Freis, Céline Kiefer, Maria de los Angeles Ramirez, Sébastien Harlepp, Damien Mertz, Benoit Pichon, Cristian Iacovita,\* Sophie Laurent and Sylvie Begin\*



## PAPERS

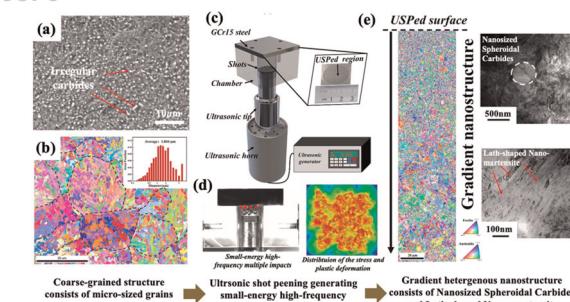
20556



## Superstructures of copper nanoclusters as NIR TADF emitters: solvent-dependent optical and morphological modulation

Sameeksha Agrawal, Debangana Shil, Aakash Gupta and Saptarshi Mukherjee\*

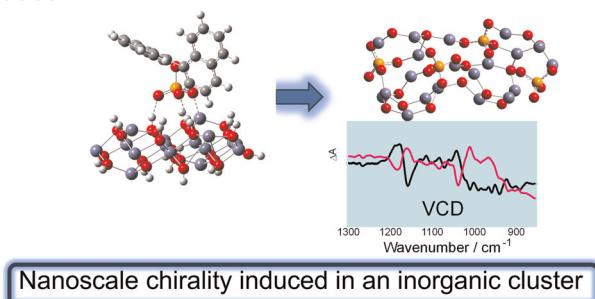
20570



## Nanoengineering steel's durability: creating gradient nanostructured spheroidal carbides and lath-shaped nano-martensite via ultrasonic shot peening

Fei Yin,\* Yuxuan Yi, Chang Yang and Gary J. Cheng\*

20589

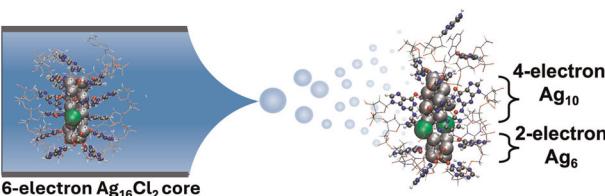


Nanoscale chirality induced in an inorganic cluster

## Nanoscale chirality generated in zinc(II) orthophosphate clusters: evidence by vibrational circular dichroism

Sumio Aisawa,\* Nami Horiguchi, Chika Chida, Jing Sang, Hidetoshi Hirahara, Akihiko Yamagishi and Hisako Sato\*

20596



## Fragmentation patterns of DNA-stabilized silver nanoclusters under mass spectrometry

Rweetuparna Guha, Sami Malola, Malak Rafik, Maya Khatun, Anna González-Rosell, Hannu Häkkinen and Stacy M. Copp\*

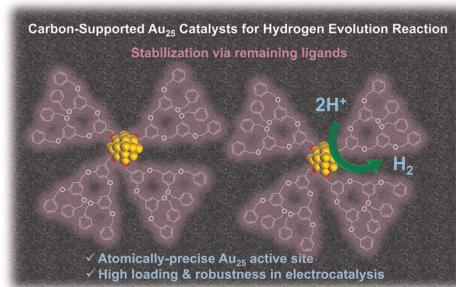


## PAPERS

20608

**Carbon-supported Au<sub>25</sub> cluster catalysts partially decorated with dendron thiolates: enhanced loading weight and durability for hydrogen evolution reaction**

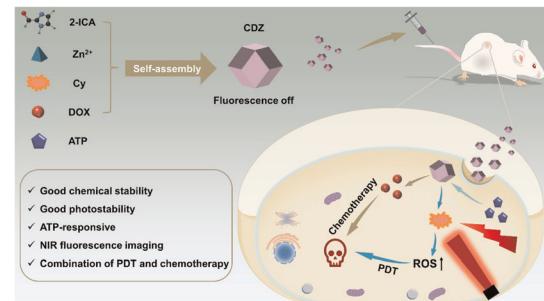
Kosuke Sakamoto, Shinya Masuda, Shinjiro Takano and Tatsuya Tsukuda\*



20617

**An ATP-responsive ZIF-based NIR fluorescence nanosystem for enhanced chemo-photodynamic therapy of tumors**

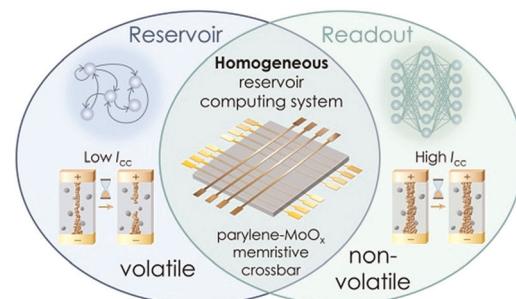
Si-Si Chen, Xiao-Fan Xu, Wei-Qun Deng, Guo-Jiang Mao, Liufang Hu, Juan Ouyang\* and Chun-Yan Li\*



20628

**Parylene-MoO<sub>x</sub> crossbar memristors as a volatile reservoir and non-volatile readout: a homogeneous reservoir computing system**

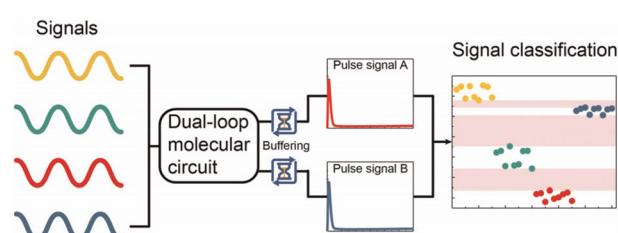
Margarita A. Ryabova, Anna N. Matsukatova, Andrey V. Emelyanov,\* Alexander A. Nesmellov, Timofey D. Patsaev and Vyacheslav A. Demin



20637

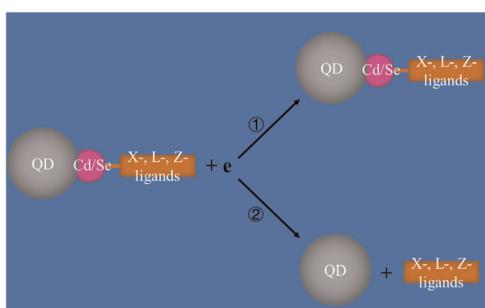
**Engineering a dual-loop molecular circuit with buffering capability to solve molecular information tasks**

Xin Liu, Shuang Cui, Xun Zhang, Yao Yao, Bang Zhang, Bin Wang and Qiang Zhang\*



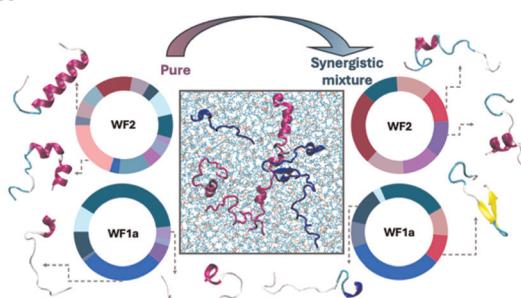
## PAPERS

20647

**Ligand effect on surface reconstruction in CdSe quantum dots driven by electron injection in electroluminescence processes**

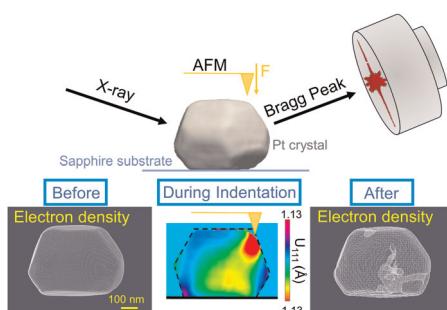
Xiangyu Huo, Yujuan Xie, Xian Wang, Li Zhang and Mingli Yang\*

20657

**Emergent conformational and aggregation properties of synergistic antimicrobial peptide combinations**

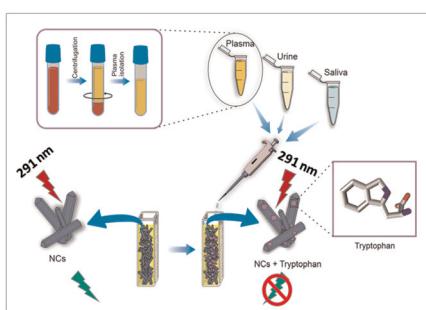
Miruna Serian, A. James Mason and Christian D. Lorenz\*

20670

***In situ* three-dimensional observation of plasticity onset in a Pt nanoparticle**

Sarah Yehya,\* Thomas W. Cornelius, Marie-Ingrid Richard, Felisa Berenguer, Mor Levi, Eugen Rabkin, Olivier Thomas and Stéphane Labat

20679

**Orotic acid-capped Tb(III)-doped calcium sulphate nanorods for the selective detection of tryptophan**

Jaydeep Kumar, Neha Yadav, Viplove Mishra, Heramba V. S. R. M. Koppisetti, Avishek Roy, Antarip Mitra and Venkataramanan Mahalingam\*

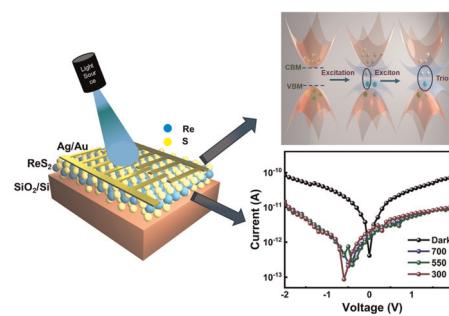


## PAPERS

20689

**Understanding the emergence of negative photoconductivity in CVD grown  $\text{ReS}_2$  thin films by invoking the trion generation mechanism**

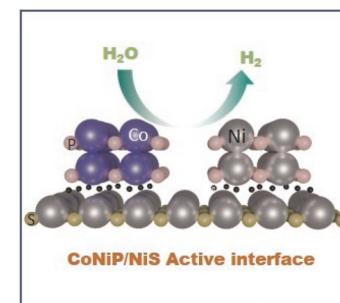
Sakshi Garg, Abhishek Ghosh, Pallavi Aggarwal, Taslim Khan, Sonika Singh, Ashok Kapoor and Rajendra Singh\*



20701

**Synergistic interfacial electronic modulation of topotactically developed bimetallic  $\text{CoNiP}$  on  $\text{NiS}$  nanorods for enhanced alkaline hydrogen evolution reaction**

W. B. Dilebo, M.-C. Tsai,\* C.-Y. Chang, H. G. Edao, Y. Nikodimos, E. A. Moges, K. Lakshmanan, F. T. Angerasa, C. B. Guta, K. B. Ibrahim, Y. A. Awoke, T. Alamirew, W.-S. Liao, G. B. Desta, J.-L. Chen, W.-N. Su\* and B. J. Hwang\*



20714

**Self-assembled nanostructured membranes with tunable pore size and shape from plant-derived materials**

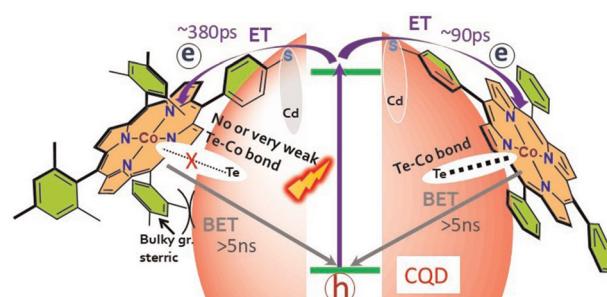
Ruiqi Dong, Na Kyung Kim, Zhuan Yi and Chinedum O. Osuji\*



20725

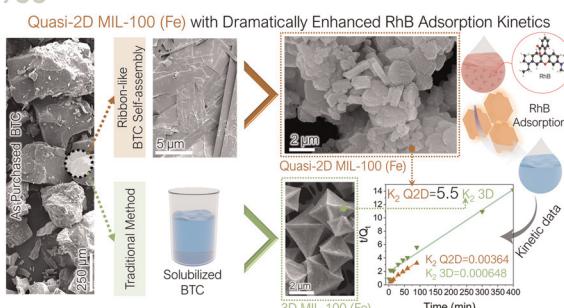
**Structure dependent activation of a Co molecular catalyst through photoinduced electron transfer from CdTe quantum dots**

Jayanta Dana,\* M. R. Ajayakumar, Alexander Efimov, Timo Weckman, Karoliina Honkala and Nikolai V. Tkachenko



## PAPERS

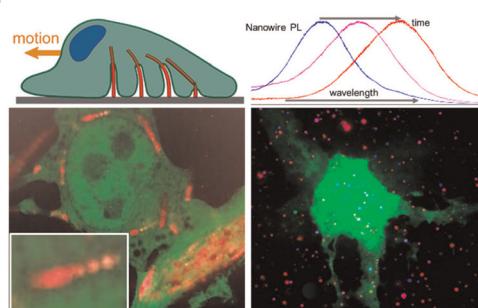
20738



**Quasi-2D MIL-100 (Fe) synthesis via benzene-1,3,5-tricarboxylic acid self-assembly: organic dye adsorption at room temperature with dramatically enhanced kinetics**

Ghazal Rabiee, Alireza Abbasi\* and Mohammad Behbahani

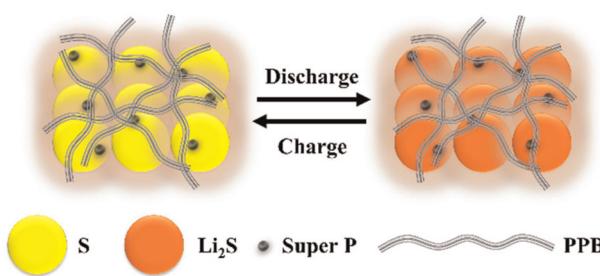
20752



**Cells have the ability to break and chemically modify GaP(As) nanowires**

Stanislav V. Shmakov, Zlata P. Sosnovitskaia, Ekaterina A. Makhneva, Maria A. Anikina, Alexey Kuznetsov, Valeriy M. Kondratev, Nikita Solomonov, Vitali M. Boitsov, Vladimir V. Fedorov, Ivan S. Mukhin, Anton S. Bukatin\* and Alexey D. Bolshakov\*

20765



**Multifunctional water-soluble binders for Li–S batteries**

Hongbang Zheng, Longli Ma, Pengshu Yi, Zhan Fang, Yuhang Yuan, Jianfeng Shen\* and Mingxin Ye\*

## CORRECTIONS

20774

**Correction: Nucleic acid detection with single-base specificity integrating isothermal amplification and light-up aptamer probes**

Jaekyun Baek, Jihyun Park and Youngeun Kim\*



## CORRECTIONS

20775

**Correction: Nanorod-associated plasmonic circular dichroism monitors the handedness and composition of  $\alpha$ -synuclein fibrils from Parkinson's disease models and post-mortem brain**

Francesca Longhena, Rihab Boujelbene, Viviana Brembati, Michele Sandre, Luigi Bubacco, Sergio Abbate, Giovanna Longhi\* and Arianna Bellucci\*

