

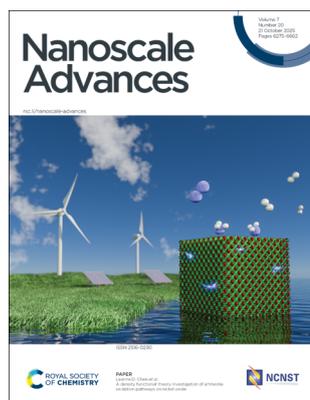
# Nanoscale Advances

An open access journal publishing across the breadth of nanoscience and nanotechnology  
[rsc.li/nanoscale-advances](https://rsc.li/nanoscale-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 2516-0230 CODEN NAADAI 7(20) 6275–6662 (2025)



### Cover

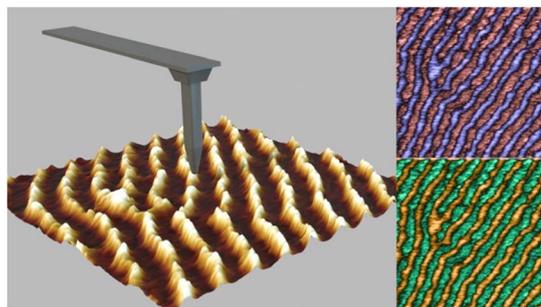
See Leanne D. Chen *et al.*, pp. 6438–6450. Image reproduced by permission of Brendan D. Paget from *Nanoscale Adv.*, 2025, 7, 6438. Wind turbine asset reused from GassyMule.

## REVIEWS

6286

### Advances in nanomechanical property mapping by atomic force microscopy

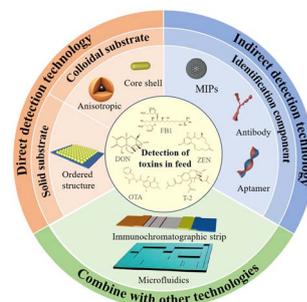
Ricardo Garcia\* and Jaime R. Tejedor



6308

### Research advances in SERS-based sensing platforms for multiplex mycotoxin detection in feed

Yuxuan Chen, Ruipeng Chen, Hui Wang, Jiawen Zhao, Dongxia Pan, Liang Yang, Xiangfang Tang\* and Benhai Xiong\*



**GOLD  
OPEN  
ACCESS**

# EES Batteries

**Exceptional research on  
batteries and energy storage**

Part of the EES family

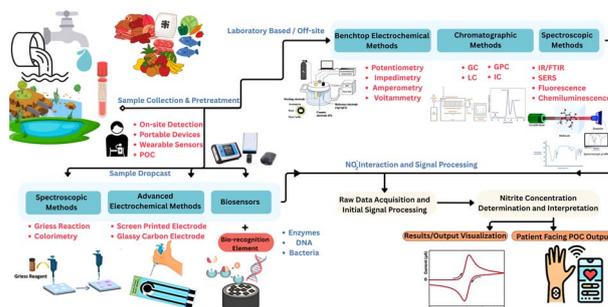
**Join  
in** | Publish with us  
[rsc.li/EESBatteries](https://rsc.li/EESBatteries)

## REVIEWS

6321

### Advances in the chemical analysis of nitrite in environmental and biological samples

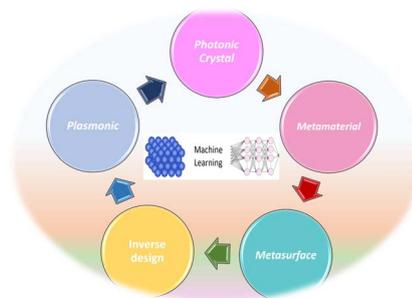
Nadeen Rajab, Hosny Ibrahim, Daohong Zhang, Ahmed F. A. Youssef\* and Rabeay Y. A. Hassan\*



6373

### Self-organization of photonic structures in colloidal crystals in the AI era

Neha Yadav, Mingming Liu, Yongling Wu, Ashish Yadav\* and Hongyu Zheng\*

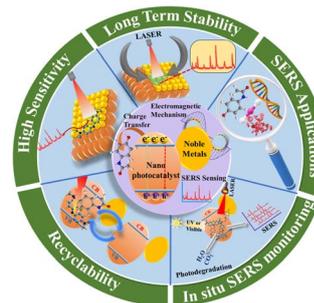


## MINIREVIEW

6394

### The emerging role of semiconductor nano-photocatalysts in strengthening surface enhanced Raman scattering applicability for sustainable multifunctional applications

Samriti, Sahil Thakur, Rupam Sharma and Jai Prakash\*



## COMMUNICATIONS

6412

### Carbon quantum dot-based fluorometric detection of nitrosamine impurities in active pharmaceutical ingredients

Gayathri Loganathan, Pirangi Srikanth, Khaja Moinuddin Shaik and Sukhendu Nandi\*

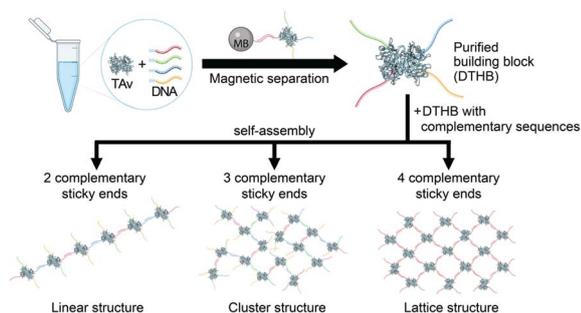


☠ = *N*-Nitrosamine

CQDs = Carbon Quantum Dots



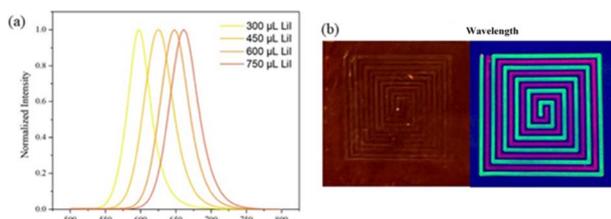
6417



### Engineering versatile supramolecular structures with tetraivalent DNA-traptavidin building blocks

Dayoung Gloria Lee, Young-Youb Kim, Hoonil Yang and Yoon-Kyu Song\*

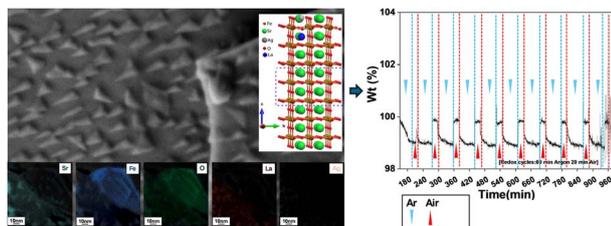
6422



### Scalable synthesis and optical tuning of CsPbBr<sub>3</sub> nanocrystal inks for dual-color anti-counterfeiting applications

Tianming Sun, Yining Zhao, Yujia Fan, Xiaoyu Guo, Zhexin Tang and Mingqing Wang\*

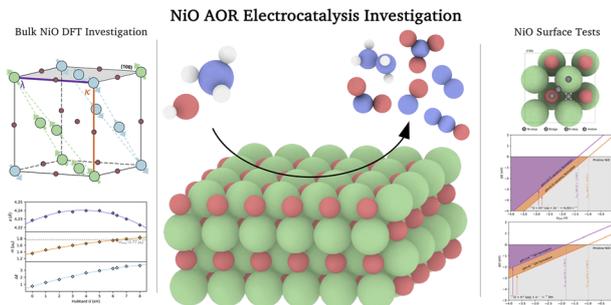
6426



### Exsolution of Fe-based pyramidal nanostructures from a noble metal doped perovskite matrix

Deblina Majumder,\* Shailza Saini, William S. J. Skinner, Alex Martinez Martin, Gwilherm Kerherve, David J. Payne, Debayan Mondal, Evangelos I. Papaioannou\* and Kalliopi Kousi\*

6438



### A density functional theory investigation of ammonia oxidation pathways on nickel oxide

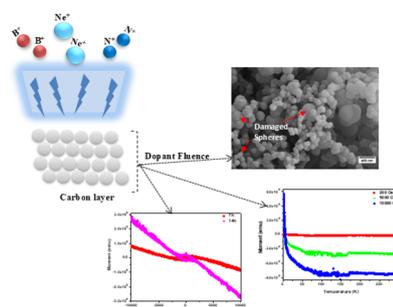
Brendan D. Paget, Shayne J. Johnston, Henry Lim and Leanne D. Chen\*



6451

### Modulating properties of solid carbon nanospheres via ion implantation with hetero-ions

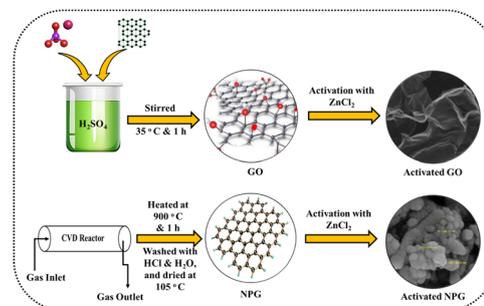
Joyce B. Matsoso, Kamalakannan Ranganathan, Daniel Wamwangi, Rudolph Erasmus, Neil J. Coville\* and Trevor Derry\*



6462

### Optimized adsorption of volatile organic compounds on graphene oxide and nanoporous graphene activated with ZnCl<sub>2</sub>: a combined experimental and computational study

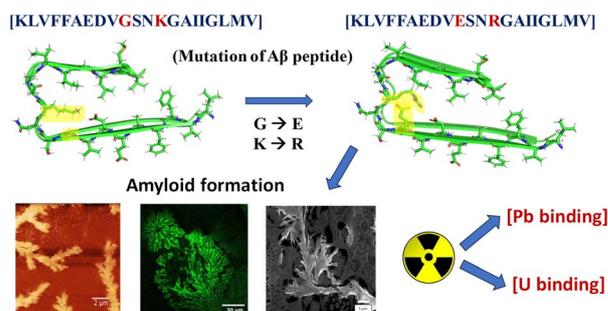
Tahereh Zafari, Soheila Sharafinia, Alimorad Rashidi,\* Mehdi D. Esrafil, Bahram Keyvani and Mohsen Mousavi



6475

### Amyloid formation of mutated Alzheimer's A $\beta$ 16–36 residues peptide and application in toxic lead and uranium ion binding

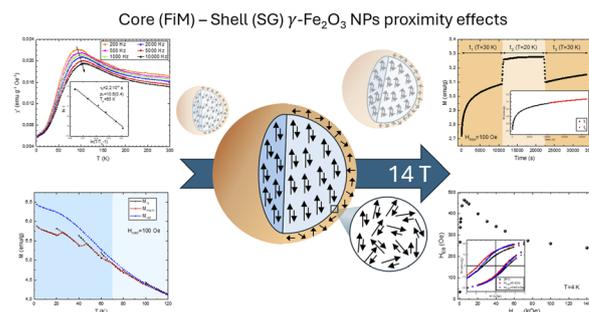
Aishwarya Natarajan, Late Ramakrishna Vadrevu, Aruna Jyothi Kora and Krishnan Rangan\*



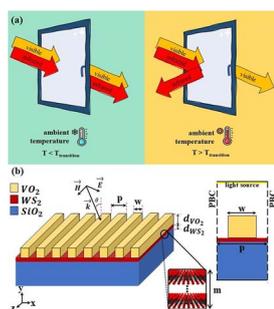
6491

### Proximity effects, exchange bias and magnetic relaxation in $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles

M. González de la Vega, M. P. Fernández-García, L. Marcano, N. Yaacoub, J. M. Grenèche, D. Martínez-Blanco, A. Adawy, M. Sevilla, A. B. Fuertes, Jesús A. Blanco\* and Pedro Gorria\*



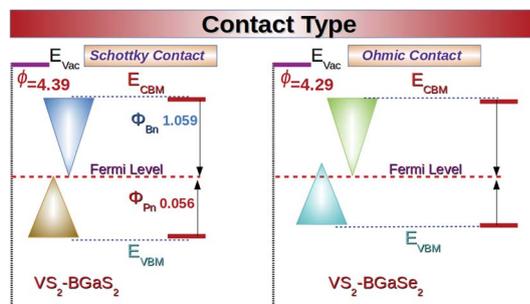
6504



### Smart windows based on VO<sub>2</sub> and WS<sub>2</sub> monolayers

Mahdieh Hashemi,\* Mona Gandomi, Maryam Moradi and Narges Ansari

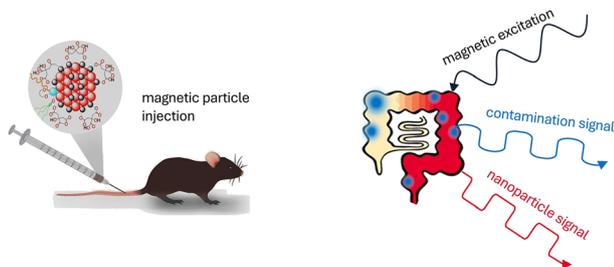
6514



### Role of induced-strain and interlayer coupling in contact resistance of VS<sub>2</sub>-BGaX<sub>2</sub> (X = S, Se) van der Waals heterostructures

Umair Khan, Basit Ali, Tahani A. Alrebdi, M. Bilal, M. Shafiq, M. Idrees and Bin Amin\*

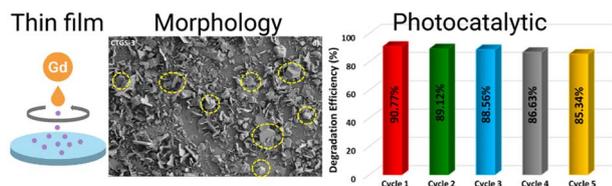
6525



### Magnetic particle spectroscopy for Eu-VSOP quantification in intestinal inflammation: distinguishing nanoparticle signals from dietary contamination

Norbert Löwa,\* Laura Golusda, Daniela Paclik, Heike Traub, Mathias Schannor, Jessica Saatz, Christian Freise, Matthias Taupitz, Britta Siegmund, Anja A. Köhl and Frank Wiekhorst

6535



### Cu<sub>2</sub>Sn<sub>1-x</sub>Gd<sub>x</sub>S<sub>3</sub> thin films for photocatalytic degradation of methylene blue

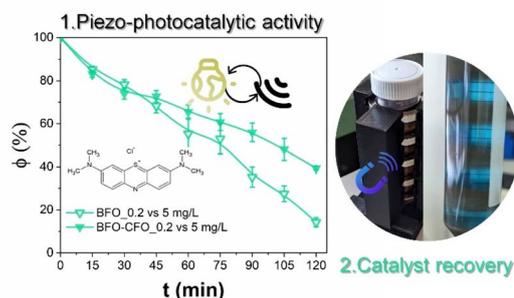
Serap Yiğit Gezgin, Şilan Baturay, M. Zafer Köylü, Mohamed A. Basyooni-M. Kabatas\* and Hamdi Şükür Kiliç



6551

### Insights into the piezo-photocatalytic activity and optimized magnetic recovery of hybrid bismuth ferrite-based nanosystems

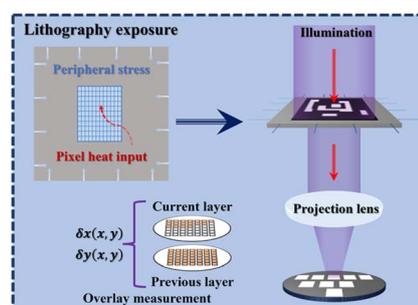
P. Maltoni,\* N. Ghibaudo, A. Kumar, G. Barucca, M. Vocciante, F. Locardi, G. Varvaro, S. Slimani, M. Ferretti, T. Sarkar, A. Reverberi, S. Alberti\* and D. Peddis



6563

### Method of high-order advanced lithography overlay correction to enhance the manufacturing performance of integrated circuits

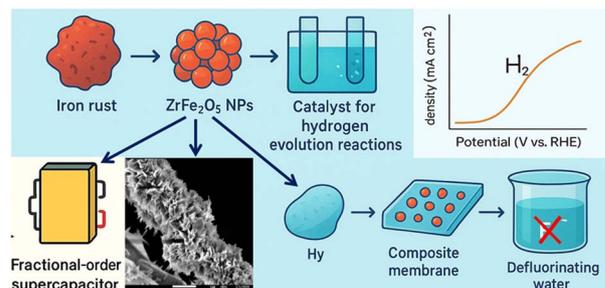
Dinghai Rui, Libin Zhang,\* Yayi Wei\* and Yajuan Su



6575

### Zirconium ferrite nanoparticles as smart materials for energy and environmental applications: fractional-order supercapacitors, reservoirs of F<sup>-</sup> ions, and efficient electrocatalysts for water splitting

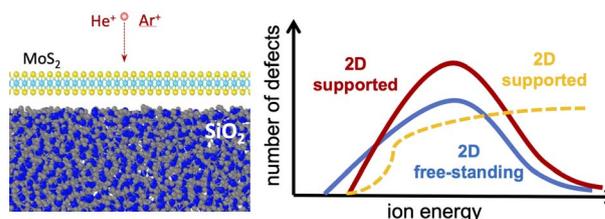
Amit Sahoo, Achyuta N. Acharya,\* Priyambada Jena, M. Moonis, J. P. Biswal, S. Swain and M. C. Tripathy



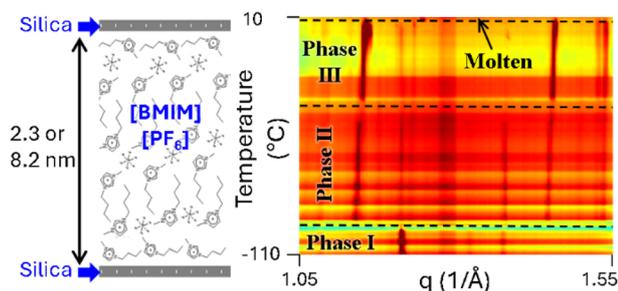
6596

### Simulations of the response of supported 2D materials to ion irradiation with explicit account for the atomic structure of the substrate

Mitisha Jain,\* Silvan Kretschmer and Arkady V. Krashennnikov\*



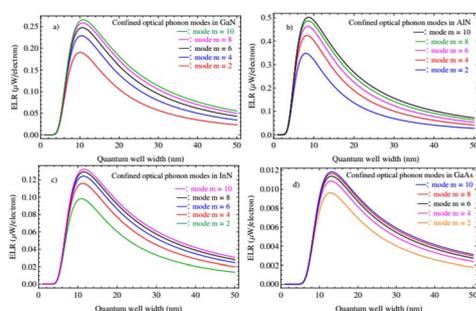
6607



### Crystallization of nanopore-confined imidazolium ionic liquids probed by temperature-resolved *in situ* grazing-incidence wide angle X-ray scattering (GIWAXS)

Yuxin He, M. Arif Khan, Andrew D. Drake, Joshua Garay, Aniruddha Shirodkar, Stephen Goodlett, Joseph Strzalka, Folami Ladipo, Barbara L. Knutson\* and Stephen E. Rankin\*

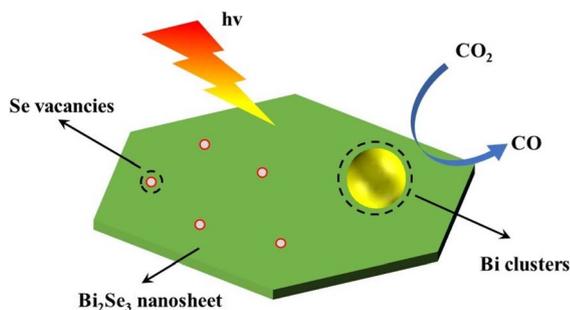
6620



### Optical phonon confinement significantly lowers the hot electron energy loss rate in III-nitride (InN, GaN, and AlN) and GaAs nanoscale structures

Huynh Thi Phuong Thuy and Nguyen Dinh Hien\*

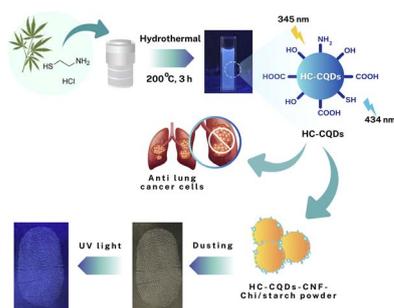
6640



### Synergistic selenium vacancies and bismuth metal centers on Bi<sub>2</sub>Se<sub>3</sub> for enhanced photocatalytic CO<sub>2</sub> reduction

Yanjun Zhu, Qitong Han\* and Yong Zhou\*

6646



### Synthesis of carbon quantum dots based on hemp leaves and cysteamine for latent fingerprint detection and their potential therapeutic anticancer application

Ratchaneekorn Kampangta, Apichart Saenchoopa, Waranya Obrom, Wonn Shweyi Thet Tun, Chatchai Muanprasat, Kazuhiko Maeda, Pornsiri Suwannapaporn, Chomponoot Suppasso, Wasan Seemakram, Sophon Boonlue and Sirinan Kulchat\*



## RETRACTION

6659

**Retraction: CTL–doxorubicin (DOX)–gold complex nanoparticles (DOX–AuGCs): from synthesis to enhancement of therapeutic effect on liver cancer model**

Qiqian Liu, Hui Liu, Pasquale Sacco, Nadia Djaker, Marc Lamy de la Chapelle, Eleonora Marsich, Xiaowu Li\* and Jolanda Spadavecchia\*

