

# Materials Advances

An open access journal publishing across the breadth of materials science

[rsc.li/materials-advances](https://rsc.li/materials-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 2633-5409 CODEN MAADC9 5(3) 833-1350 (2024)



### Cover

See Guglielmo Guido Condorelli *et al.*, pp. 1033–1044. Image reproduced by permission of Vincenzo Paratore and Guglielmo Guido Condorelli from *Mater. Adv.*, 2024, 5, 1033.



### Inside cover

See D. P. Halliday *et al.*, pp. 1045–1055. Image reproduced by permission of Greg Robson.

## REVIEWS

846

### Titanium nitride (TiN) as a promising alternative to plasmonic metals: a comprehensive review of synthesis and applications

Ujjwal Mahajan, Mahesh Dhonde,\* Kirti Sahu,\* Pintu Ghosh and Parasharam M. Shirage\*



896

### Rational design of SiO<sub>x</sub> based anode materials for next generation lithium-ion batteries

Yuanteng Yang, Yanxia Liu, Xiaoli Jiang, Lin Zhao, Penglei Wang\* and Yagang Zhang\*



# Environmental Science journals

One impactful portfolio for  
every exceptional mind

Harnessing the power of interdisciplinary  
science to preserve our environment



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

Fundamental questions  
Elemental answers

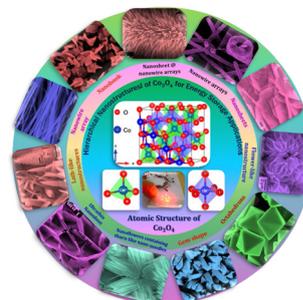


## REVIEWS

920

### Recent advances in hydrothermally and solvothermally grown $\text{Co}_3\text{O}_4$ nanostructures for electrochemical energy storage (EES) applications: a brief review

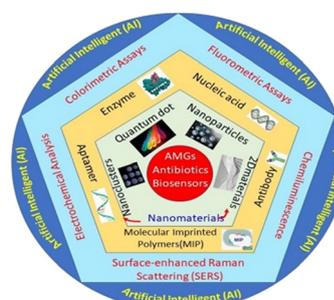
Radhika S. Desai, Vinayak S Jadhav, Pramod S. Patil\* and Dhanaji S. Dalavi\*



961

### Current advancement in nanomaterial-based emerging techniques for the determination of aminoglycosides antibiotics for antibiotic resistance surveillances

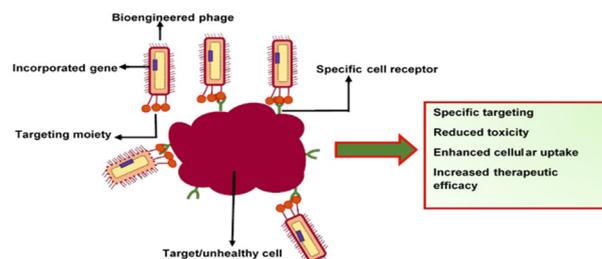
Reena K. Sajwan, S. Z. H. Hashmi, Jayendra Kumar Himanshu, Anjali Kumari and Pratima R. Solanki\*



986

### Bacteriophages as nanocarriers for targeted drug delivery and enhanced therapeutic effects

Stephen C. Emencheta, Adaye L. Onugwu,\* Chisom F. Kalu, Patience N. Ezinkwo, Osita C. Eze,\* Marta M. D. C. Vila, Victor M. Balcão, Anthony A. Attama and Ebele B. Onuigbo

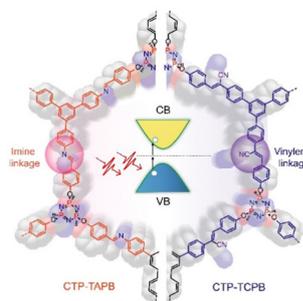


## COMMUNICATIONS

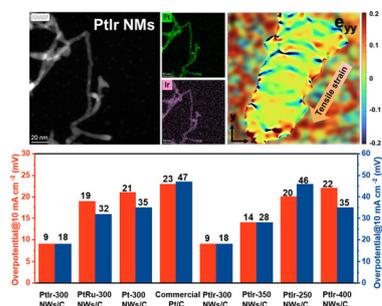
1017

### Cyclotriphosphazene-based organic frameworks as third-order nonlinear optical materials

Suresh Bommakanti, Satyapriya Nath, Rudrashish Panda, Ritwick Das\* and Bishnu P. Biswal\*



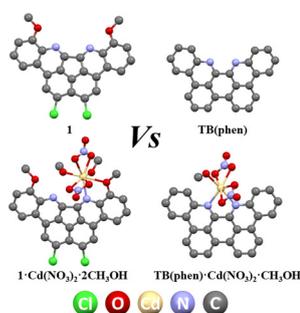
1022



### Alloy/strain engineering of Pt-based nanowires with controllable electronic structures towards boosted water electrolysis catalysis

Jiakang Tian, Senmin Lin, Zhongmin Tang, Runhua Li, Xiaomei Cheng, Zhen Fang, Bin Wang, Jiaheng Peng,\* Lang Xiao, Benwei Fu, Tao Deng\* and Jianbo Wu\*

1028

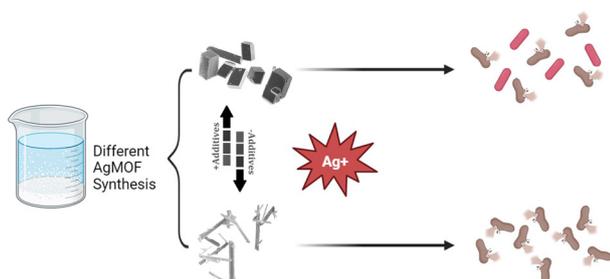


### Pentatomic carbon ring conjugated nitrogen-doped nanographene

Jinku Bai, Xiao Xu, Xin-Yue Wang, Xin Sun, Jiaqi Liang, Tongling Liang and Han-Yuan Gong\*

## PAPERS

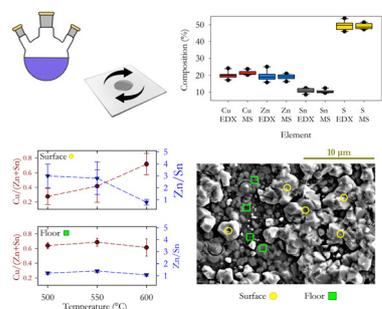
1033



### New metastable interfacial synthesis of a silver-terephthalate metal organic framework: structure, morphology and antibacterial activities

Vincenzo Paratore, Domenico Franco, Salvatore Guglielmino, Francesca Lo Presti, Francesco Traina, Sabrina Conoci and Guglielmo Guido Condorelli\*

1045



### Variability of Cu<sub>2</sub>ZnSnS<sub>4</sub> nanoparticle hot injection synthesis and modifications by thin film annealing

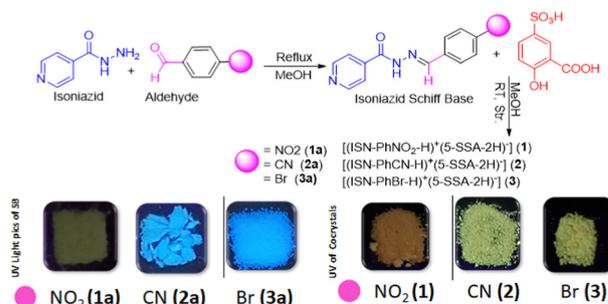
K. P. Stroh, M. Szablewski and D. P. Halliday\*



1056

## Engineering the solid-state luminescence of organic crystals and cocrystals

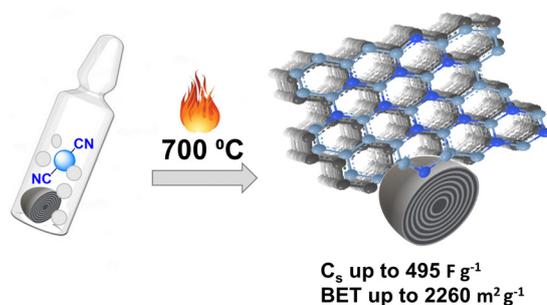
Aijaz A. Dar,\* Shaista H. Lone, Ishtiyag Ahmad, Aadil A. Ahangar, Arshid A. Ganie and Cherumannil Femina



1065

## Rational design of carbon nanocomposites with hierarchical porosity: a strategy to improve capacitive energy storage performance

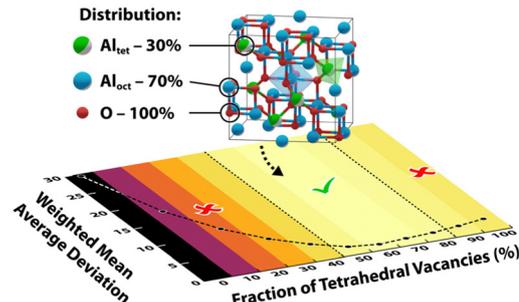
Agnieszka Hryniewicka,\* Joanna Breczko, Gabriela Siemiaszko, Krzysztof Brzezinski, Anna Ilnicka, Artur P. Terzyk and Marta E. Plonska-Brzezinska\*



1078

## Determination of the vacancy distribution over Al cation sites in $\gamma$ -Al<sub>2</sub>O<sub>3</sub>

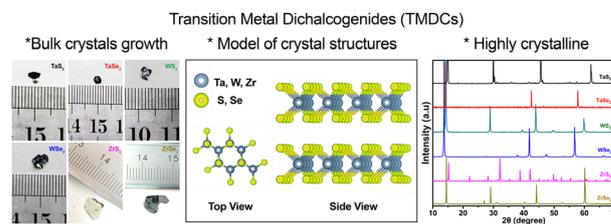
Henry O. Ayoola, Cheng-Han Li, Stephen D. House, Matthew P. McCann, Joshua J. Kas, Joerg R. Jinschek, John J. Rehr, Wissam A. Saidi\* and Judith C. Yang\*



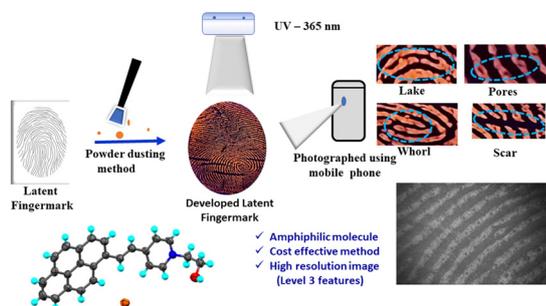
1088

## Bridging the gap: an in-depth comparison of CVT-grown layered transition metal dichalcogenides for supercapacitor applications

Muhammad Habib,\* Zahir Muhammad, Yasir A. Haleem,\* Sajid Farooq, Raziq Nawaz, Adnan Khalil, Fozia Shaheen, Hamza Naeem, Sami Ullah and Rashid Khan\*



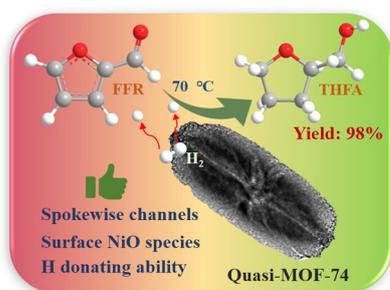
1099



### Real-time visualization of latent fingerprints with level 3 details based on a solid state emissive organic fluorophore using the powder dusting method

Arivalagan Shabashini, Sathiaraj Richard, Manas K. Panda,\* Sumit K. Panja\* and Ganesh Chandra Nandi\*

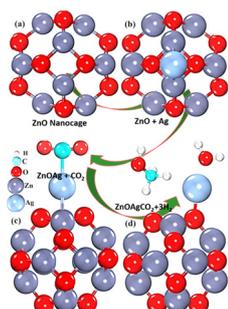
1106



### Synthesis of Quasi-MOFs featuring special hub-and-spoke channels and surface NiO species for enhanced total hydrogenation of furfural

Qiuju Fu, Liting Yan, Lingzhi Yang,\* Dandan Liu, Shuo Zhang, Huimin Jiang, Wenpeng Xie, Haiyan Wang\* and Xuebo Zhao\*

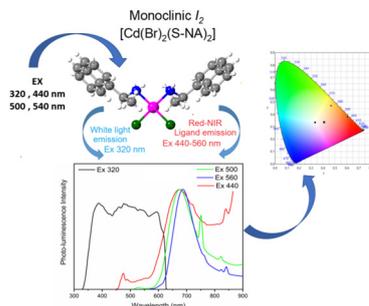
1119



### Sensing and conversion of carbon dioxide to methanol using Ag-decorated zinc oxide nanocatalyst

Sheraz Ahmad, Akbar Hussain, Shabeer Ahmad Mian,\* Gul Rahman, Shaukat Ali and Joonkyung Jang\*

1130



### Assembly of a cadmium(II)-based chiral complex: crystal structure and optical properties for solid state white-light emission applications

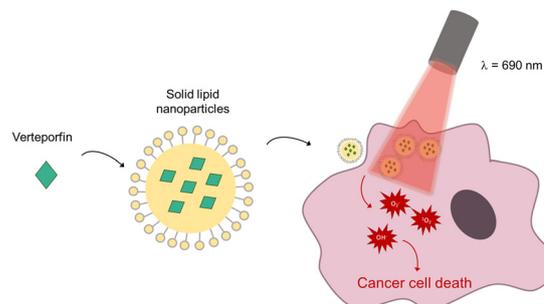
Mahdi Gassara, Xinghui Liu,\* Ahlem Guesmi, Ammar Houas, Naoufel Ben Hamadi and Houcine Naili\*



1137

### Lipid nanoparticles as efficient verteporfin nanocarriers for photodynamic therapy of cancer

Tomás Mendes, Andreia Granja\* and Salette Reis



1147

### Optical and chemical properties of As–Se and As–S–Se solution processed thin films prepared via $As_{50}Se_{50}$ source solution modification

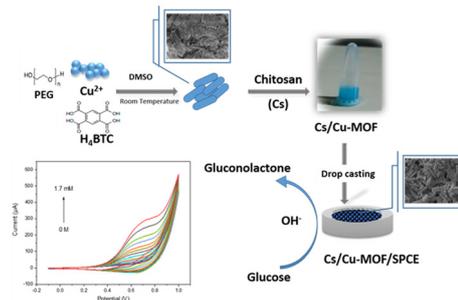
Jiri Jemelka, Michal Kurka, Stanislav Slang, Jiri Jancalek, Karel Palka\* and Miroslav Vlcek



1160

### Non-enzymatic amperometric glucose sensing by novel Cu-MOF synthesized at room temperature

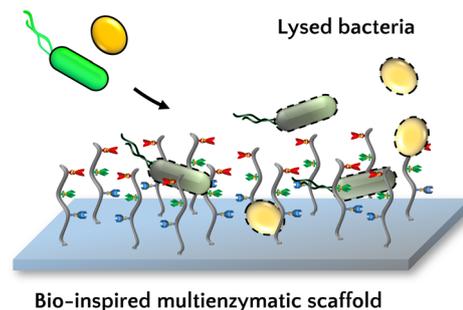
Sondes Guesmi, Kaveh Moulaei, Viviana Bressi, Hamza Kahri, Amani Khaskhoussi, Claudia Espro, Houcine Barhoumi and Giovanni Neri\*



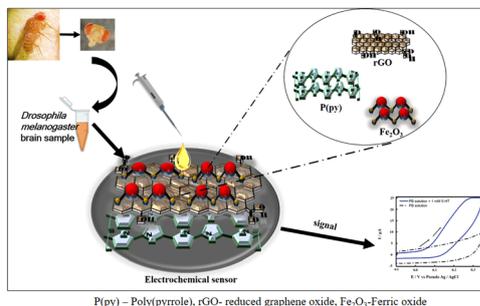
1171

### Simultaneous enzyme grafting on bio-inspired scaffolds for antibacterial protection

Baptiste Arbez, Chloé Retourney, Fabienne Quilès, Gregory Francius, Henri-Pierre Fierobe and Sofiane El-Kirat-Chatel\*



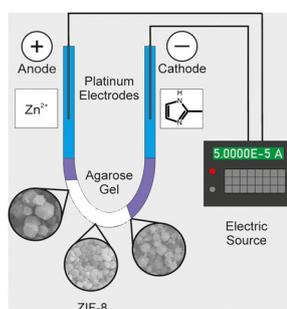
1185



### An iron(III) oxide-anchored conductive polymer–graphene ternary nanocomposite decorated disposable paper electrode for non-enzymatic detection of serotonin

Sharmila Prashanth, Raifa Abdul Aziz, Shamprasad Varija Raghu, Yoon-Bo Shim, K. Sudhakara Prasad\* and Airody Vasudeva Adhikari\*

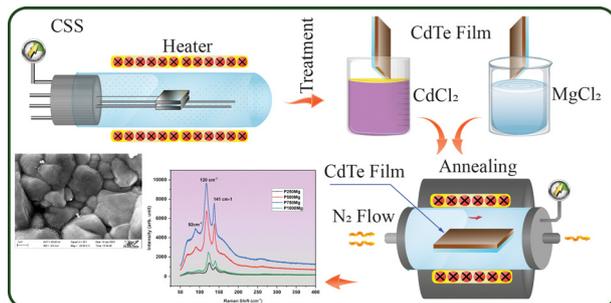
1199



### Synthesis of zeolitic imidazolate framework-8 using an electric field in a gelled medium

Norbert Németh, Gábor Holló, Nadia Valletti, Szabolcs Farkas, Brigitta Dúzs, Ákos Kukovecz, Gábor Schusztér, István Szalai, Federico Rossi and István Lagzi\*

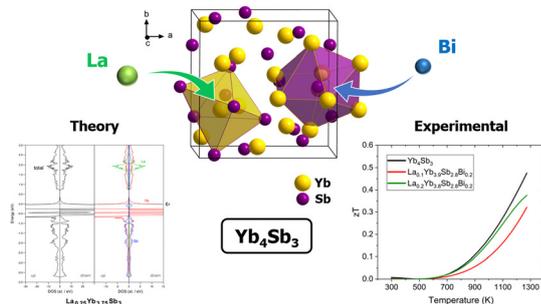
1205



### Property enhancement of a close-spaced sublimated CdTe thin film by a post-growth activation step with CdCl<sub>2</sub> and MgCl<sub>2</sub>

Afrina Sharmin, Syed Shafquat Mahmood, Munira Sultana, Md Aftab Ali Shaikh and Muhammad Shahriar Bashar\*

1217



### Advancing very high temperature thermoelectric performance of Yb<sub>4</sub>Sb<sub>3</sub> through dual-substitutions: a combined experimental and theoretical study

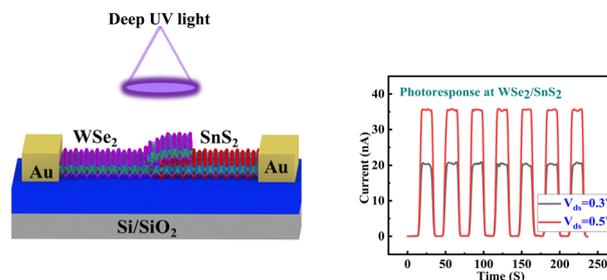
Hugo Bouteiller,\* Vincent Pelletier, Sylvain Le Tonquesse, Bruno Fontaine, Takao Mori, Jean-François Halet, Régis Gautier,\* David Berthebaud\* and Franck Gascoin



1226

### Gate-controlled rectification and broadband photodetection in a P–N diode based on TMDC heterostructures

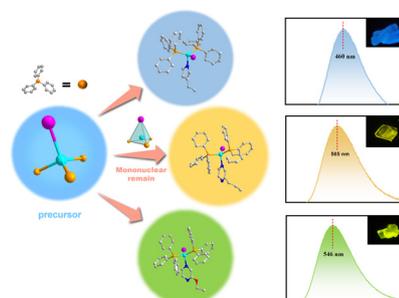
Ehsan Elahi,\* Sobia Nisar, Muhammad Rabeel, Malik Abdul Rehman, Mohamed Ouladsamne, Ahmad Irfan, Muhammad Abubakr, Jamal Aziz, Muhammad Asim and Ghulam Dastgeer\*



1234

### Molecular design towards efficient light-emitting copper(i) halide mononuclear hybrids

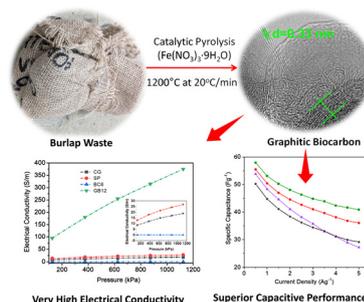
Yi Lv, Jing Yang, Haibo Li, Wei Liu\* and Gangfeng Ouyang\*



1240

### Highly conductive biocarbon nanostructures from burlap waste as sustainable additives for supercapacitor electrodes

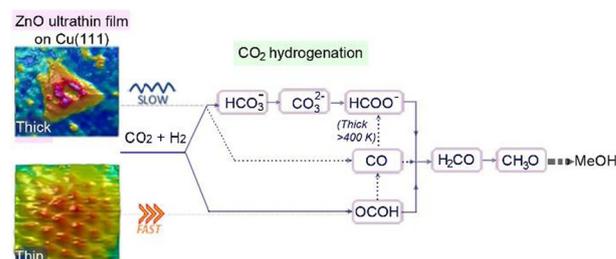
Haftom Weldekidan, Singaravelu Vivekanandhan, Neelima Tripathi, Amar Mohanty\* and Manjusri Misra



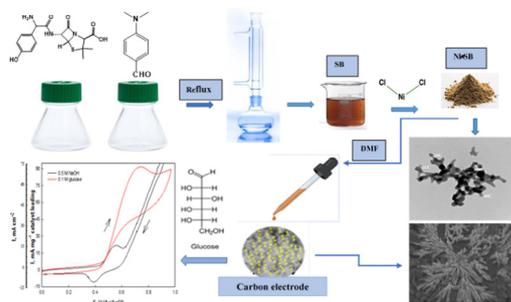
1251

### Zinc oxide–copper model nanocatalysts for CO<sub>2</sub> hydrogenation: morphology and interface effects

Sonia Hadaoui, Hang Liu, Zhang Lei, Sébastien Lebègue, Rabah Benbalagh, Alexa Courty\* and Ahmed Naitabdi\*



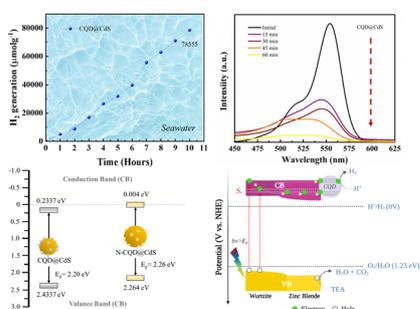
1264



### A novel Ni–Schiff base complex for motivating glucose electrooxidation in alkaline solutions

M. A. Sultan,\* Safaa S. Hassan, K. A. Omran and H. B. Hassan

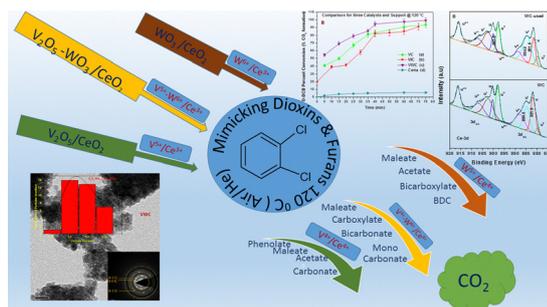
1284



### Synergistic enhancement of seawater hydrogen generation *via* sulfur vacancy enriched and phases engineered CQD loaded CdS photocatalyst

Bishal Kumar Nahak and Fan Gang Tseng\*

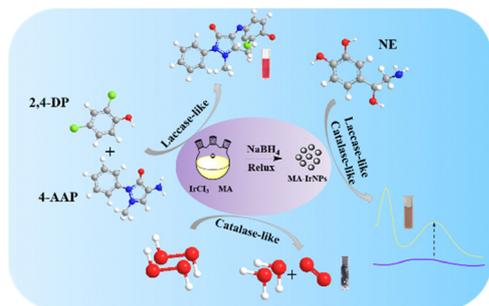
1301



### Thermal catalytic mineralization of *ortho*-dichlorobenzene at low temperature: an *in situ* FT-IR and XPS mechanistic investigation

Adarsh Kumar, Deepak Tyagi, Salil Varma, Hushan Chand, V. Krishnan, K. Bhattacharyya\* and A. K. Tyagi\*

1332



### Malic acid-coated iridium nanoparticle-induced cascade enzymatic reactions for norepinephrine detection

Xuan Chen, Lin Zhou, Zhanghong Guo and Qijun Song\*



1340

## Unlocking OER catalytic potential and chiral $\text{Fe}_3\text{O}_4$ film as a game-changer for electrochemical water oxidation pathway and by-product control

Wenyan Zhang,\* Chaoqun Jiang, Hangmin Guan, Yuanyuan Wang, Yingfei Hu, Wei Wang, Wenjie Tian and Lingyun Hao

