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# Nanoscale

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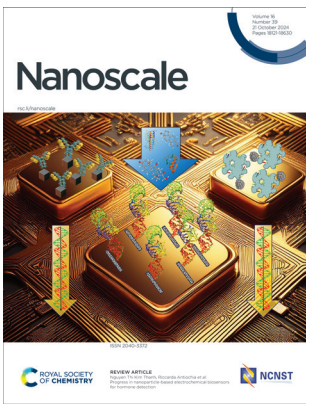


**Cover**
See Nguyen Thi Kim Thanh, Riccarda Antiochia *et al.*, pp. 18134–18164.

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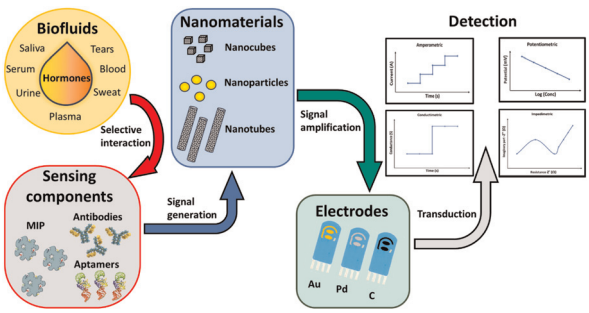
Francesco Rossi, Thithawat Trakoolwilaiwan, Valeria Gigli, Cristina Tortolini, Andrea Lenzi, Andrea Maria Isidori, Nguyen Thi Kim Thanh* and Riccarda Antiochia*

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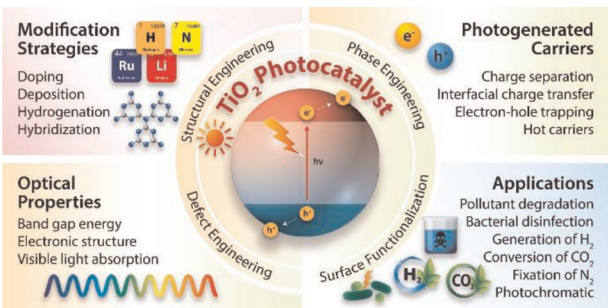
**Structurally and surficially activated $TiO_2$ nanomaterials for photochemical reactions**

Si Yin Tee,* Junhua Kong, Justin Junqiang Koh, Choon Peng Teng, Xizu Wang, Xiaobai Wang, Siew Lang Teo, Warintorn Thitsartarn, Ming-Yong Han* and Zhi Wei Seh*



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## REVIEWS

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**Recent advances in developing nanoscale electro-/photocatalysts for hydrogen production: modification strategies, charge-carrier characterizations, and applications**

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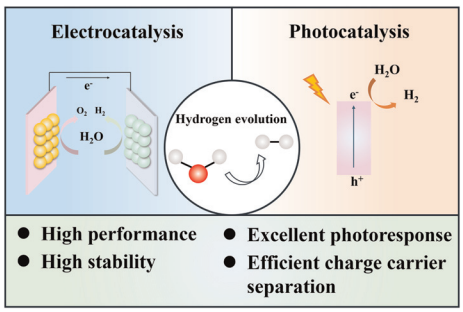


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**Biocompatible triboelectric energy generators (BT-TENGs) for energy harvesting and healthcare applications**

Sankar Ganesh Ramaraj,* Durgadevi Elamaran,* Hitoshi Tabata, Fuchun Zhang and Xinghui Liu*

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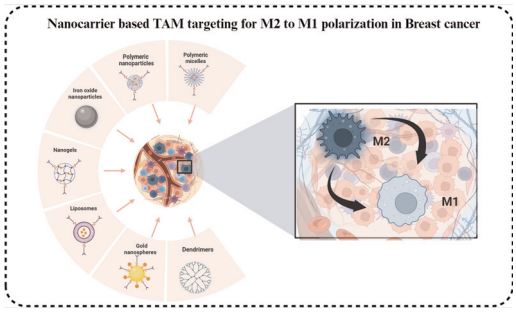
**Unleashing nanotechnology to redefine tumor-associated macrophage dynamics and non-coding RNA crosstalk in breast cancer**

Hardik Patni, Ramesh Chaudhary and Ashutosh Kumar*

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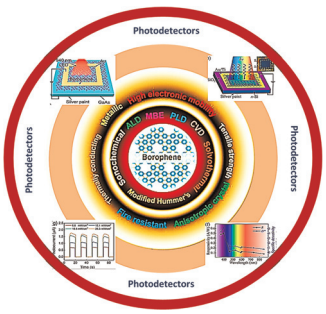
**Advances in borophene based photodetectors for a sustainable tomorrow: a comprehensive review**

Gurupada Maity,* Prashant Kumar Mishra, Geetika Patel and Santosh Dubey*



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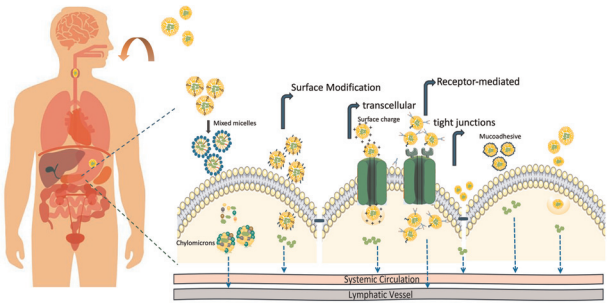


**Lipid nanoparticles for enhancing oral bioavailability**

Anushareddy Gangavarapu, Lillian V. Tapia-Lopez, Barnali Sarkar, Jaqueline Pena-Zacarias, Abu Zayed Md Badruddoza* and Md Nurunnabi*

## PAPERS

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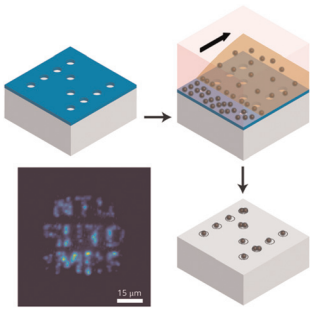
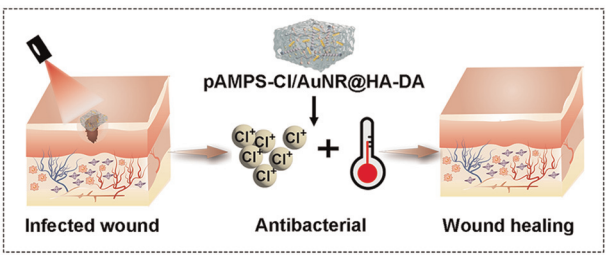



**Deterministic positioning of few aqueous colloidal quantum dots**

Muhammad Tegar Pambudi, Deepshikha Arora,* Xiao Liang, Basudeb Sain, Anupama Sargur Ranganath, Matthew R. Chua, Cam Nhung Vu, Golnoush Zamiri, Md. Abdur Rahman, Hilmi Volkan Demir,* Joel K. W. Yang* and Lu Ding*

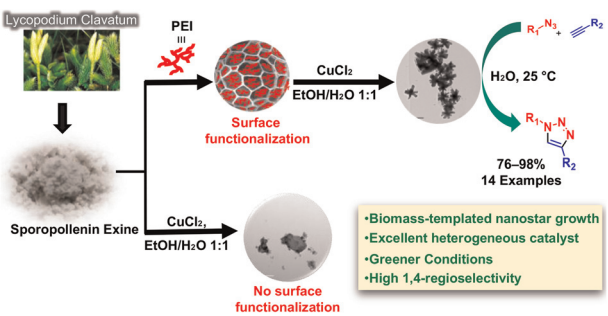
18348




**A gold nanoparticle-based photothermal hydrogel assisted by an *N*-halamine polymer for bacteria-infected skin wound healing**

Xiaojie Wu, Yaning Lu, Yangyang Gao, Jing Kang* and Alideertu Dong*

18356




**First Cu-nanostar as a sustainable catalyst realized through synergistic effects of bowl-shaped features and surface activation of sporopollenin exine**

Vijayendran Gowri, Sarita Kumari, Raina Sharma, Abdul Selim and Govindasamy Jayamurugan*



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## PAPERS

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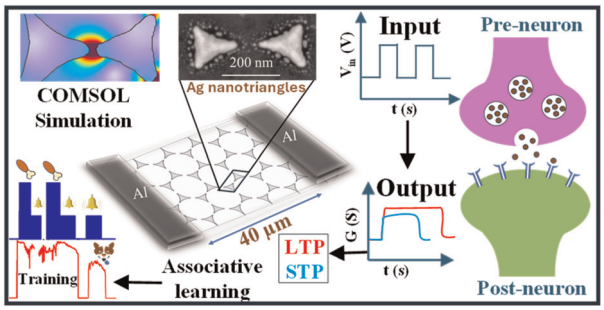
### Energy-efficient resistive switching synaptic devices based on patterned Ag nanotriangles with tunable gaps fabricated using plasma-assisted nanosphere lithography

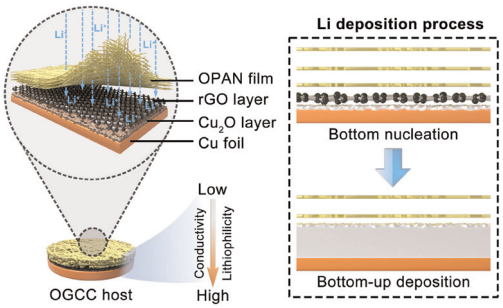
Shubham K. Mehta, Indrajit Mondal, Bhupesh Yadav and Giridhar U. Kulkarni*




18375

### An integrated dual-gradient host facilitates oriented bottom-up lithium growth in lithium metal anodes

Zhuzhu Du, Xin Chen, Ying Zhao, Yuhang Liu* and Wei Ai*

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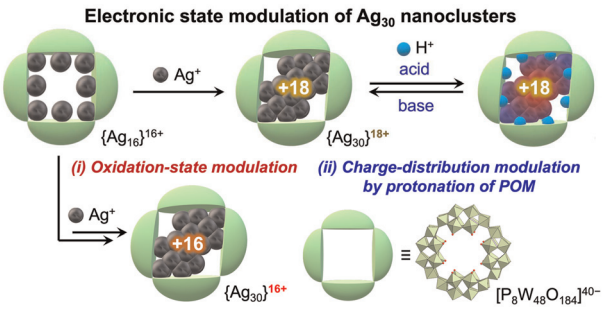
### Electronic state modulation of $Ag_{30}$ nanoclusters within a ring-shaped polyoxometalate

Daiki Yanai, Kentaro Yonesato,* Soichi Kikkawa, Seiji Yamazoe, Kazuya Yamaguchi and Kosuke Suzuki*

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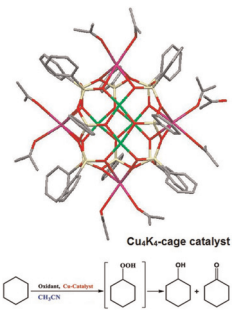
### Rational (supra)molecular design and catalytic activity of cage-like $Cu_4$-based phenylsilsesquioxanes

Anna Y. Zueva, Alexey N. Bilyachenko,* Victor N. Khrustalev, Lidia S. Shul'pina, Nikolay S. Ikonnikov, Pavel V. Dorovatovskii, Elena S. Shubina, Karim Ragimov, Nikolai N. Lobanov and Di Sun*



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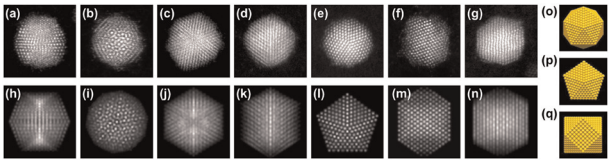

### *In situ* heating characterization of structural evolution and size-dependent melting point depression in gold nanoclusters: a comprehensive thermodynamic investigation

Shengyong Hu, Kuo-Juei Hu,* Zixiang Zhao, Yongxin Zhang, Syed Adil Shah, Siqi Lu, Wuwen Zhu, Sichen Tang and Fengqi Song*

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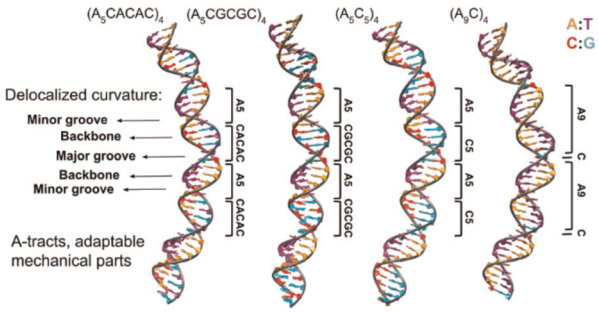


### The impact of sequence periodicity on DNA mechanics: investigating the origin of A-tract's curvature

Tania Gardasevic and Agnes Noy*

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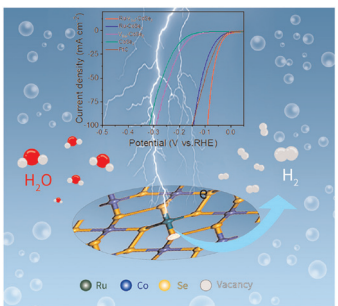


### Ru incorporated into Se vacancy-containing $CoSe_2$ as an efficient electrocatalyst for alkaline hydrogen evolution

Li Liu, Ziyi Yang, Weibo Gao, Jianghuan Shi, Jieyun Ma, Zongjian Liu,* Lin Wang,* Yichao Wang* and Zhengfei Chen*

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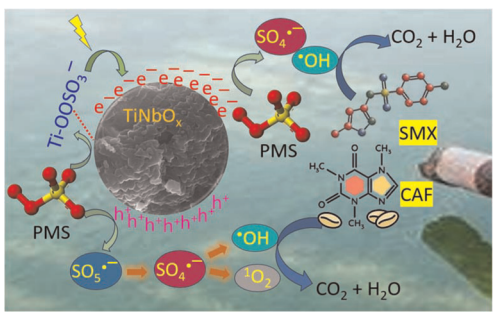


### Tailored MXene-derived nano-heterostructure oxides for peroxymonosulfate activation in the treatment of municipal wastewaters

Shalu Atri,* Elham Loni, Zuzana Dyrcikova, Frantisek Zazimal, Maria Caplovicova, Dana Dvoranova, Gustav Plesch, Miroslava Kabatova, Marcello Brigante, Michael Naguib* and Olivier Monfort*



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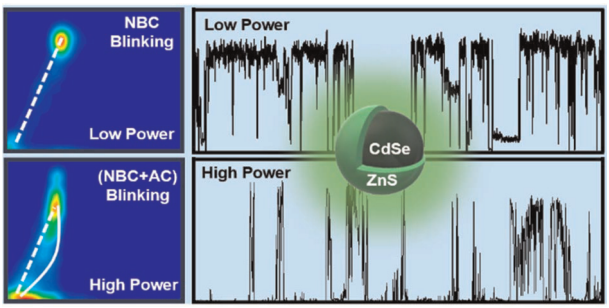
### Evidence of carrier diffusion between emission states in CdSe/ZnS core–shell quantum dots: a comprehensive investigation combining fluorescence lifetime correlation spectroscopy (FLCS) and single dot photoluminescence studies

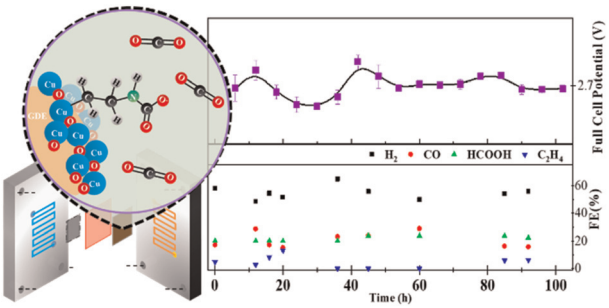
Debopam Acharjee, Mrinal Kanti Panda, Asit Baran Mahato, Ayendrila Das and Subhadip Ghosh*




18455

### Exploring the stability and catalytic activity of monoethanolamine functionalized CuO electrode in electrochemical $CO_2$ reduction

Jéssica C. de Almeida, Osmando F. Lopes, Meital Shviro, Gelson T. S. T. da Silva, Caue Ribeiro* and Vagner R. de Mendonça*

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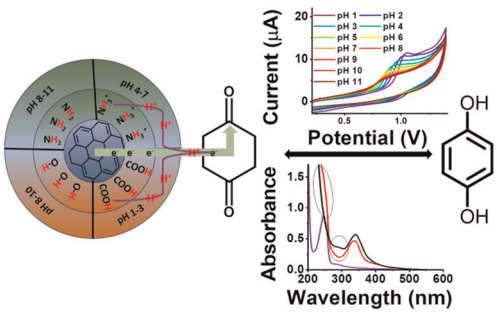
### A proton-coupled electron transfer process from functionalized carbon dots to molecular substrates: the role of pH

Umarfaruk S. Sayyad, Sapna Waghmare and Somen Mondal*

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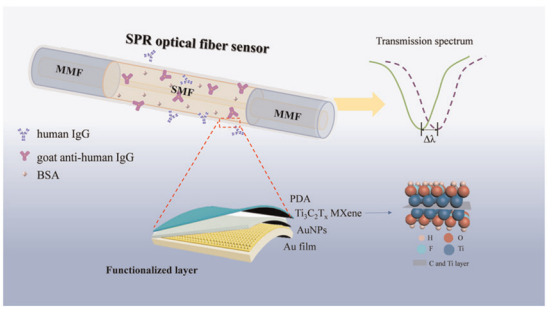
### An enhanced SPR optical fiber biosensor using $Ti_3C_2T_x$ MXene/AuNPs for label-free and sensitive detection of human IgG

Jiayi Zhu, Chao Zhao, Binyun Xia, Ning Wang,* Xi Chen,* Xinyue Jing, Minxuan Chen and Xinrui Xu



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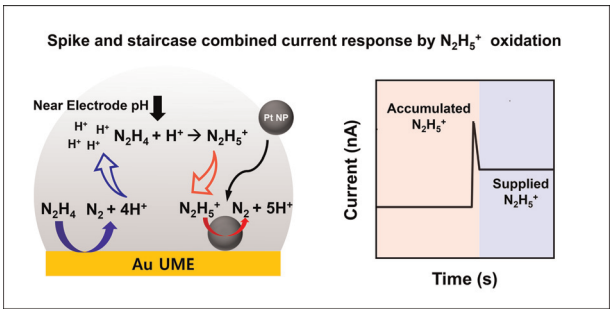


### Exploring single-entity electrochemistry beyond conventional potential windows: mechanistic insights into hydrazine/hydrazinium ion oxidation

Ki Jun Kim, Yujin Han and Seong Jung Kwon*

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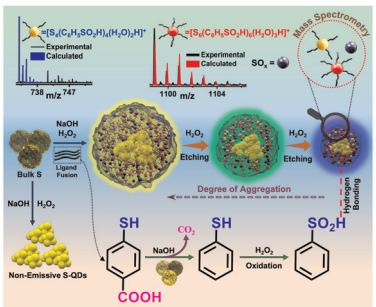


### Unravelling structural insights into ligand-induced photoluminescence mechanisms of sulfur dots

Satya Ranjan Sahoo, Arun Mukhopadhyay, Sukhendu Mahata, Komal Kumari, N. V. S. Praneeth, Ananya Baksi, Saumyakanti Khatua, Sumit Saha, Surajit Rakshit and Nirmal Goswami*

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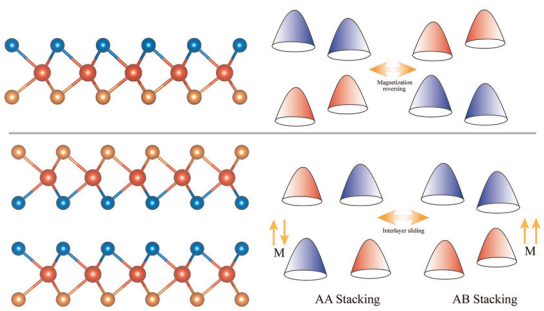


### Prediction of the two-dimensional ferromagnetic semiconductor Janus 2H-ZrTeI monolayer with large valley and piezoelectric polarizations

Jie Li, Ya-Qing Chen, Hong-Kuan Yuan and Chun-Ling Tian*

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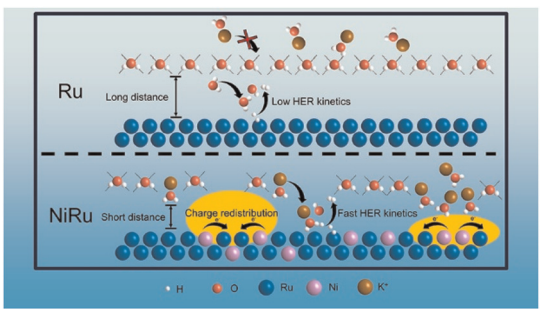


### Manipulating the interfacial water structure by electron redistribution for the hydrogen evolution reaction

Wei He, Weihang Feng and ZhengMing Sun*


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## PAPERS

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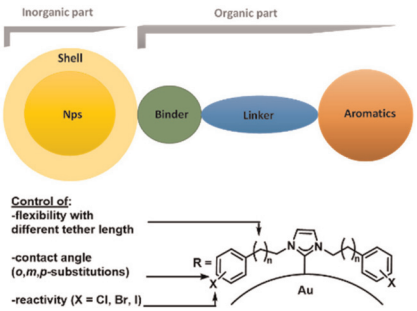
**On-surface synthesis – Ullmann coupling reactions on N-heterocyclic carbene functionalized gold nanoparticles**

Nathaniel Ukah* and Hermann A. Wegner

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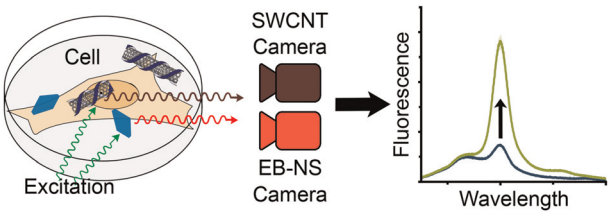
**Ratiometric near infrared fluorescence imaging of dopamine with 1D and 2D nanomaterials**

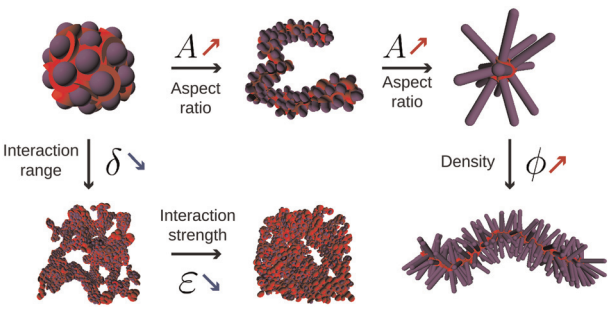
Bjoern F. Hill, Jennifer M. Mohr, Isabelle K. Sandvoss, Juliana Gretz, Phillip Galonska, Lena Schnitzler, Luise Erpenbeck and Sebastian Kruss*




18545

**Dilute suspensions of Janus rods: the role of bond and shape anisotropy**

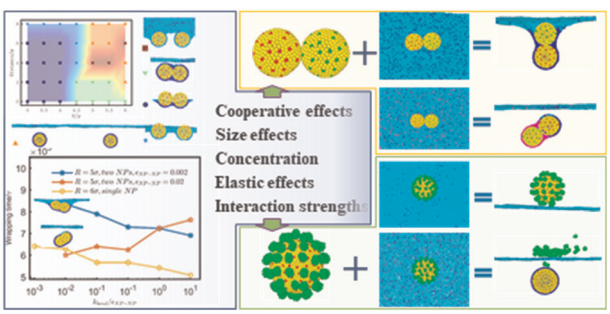
Carlo Andrea De Filippo,* Sara Del Galdo, Emanuela Bianchi, Cristiano De Michele and Barbara Capone*




18553

**Endocytosis efficiency and targeting ability by the cooperation of nanoparticles**

Teng Ma, Tianjiao Chen, Huifeng Tan, Songsong Zhang,* Hao Wei,* Qiang Wang, Zhijia Zhang, Wenjun Zhou, Lin Wang and Guojun Wang



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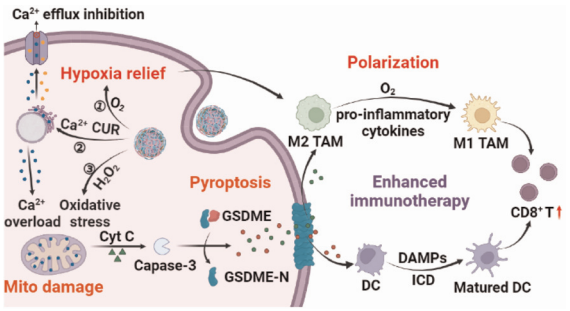
18570




### Synergistic immunotherapy with a calcium-based nanoinducer: evoking pyroptosis and remodeling tumor-associated macrophages for enhanced antitumor immune response

Fang Cheng, Lei He, Jiaqi Wang, Lunhui Lai, Li Ma, Kuiming Qu, Zicheng Yang, Xinyue Wang, Ruyu Zhao, Lixing Weng* and Lianhui Wang*

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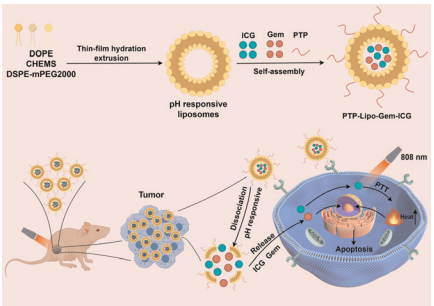
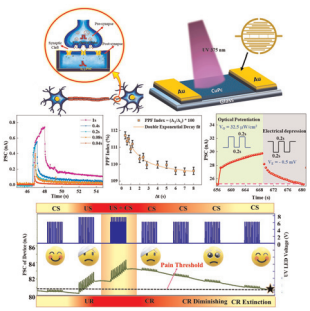



### Plectin-1-targeted recognition for enhancing comprehensive therapy in pancreatic ductal adenocarcinoma

Qing Zhu, Silue Zeng, Junying Yang, Jiaming Zhuo, Peifeng Wang, Sai Wen and Chihua Fang*

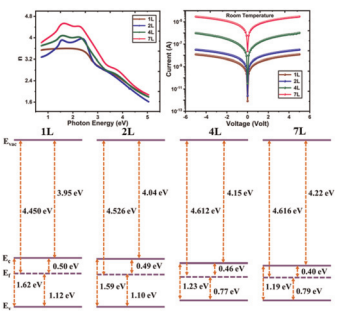
18597




### Combined optical and electrical control of a low-power consuming (~fJ) two-terminal organic artificial synapse for associative learning and neuromorphic applications

Amrita Bharati Mishra and R. Thamankar*

18609




### Film thickness-induced optical and electrical modifications in large-area few-layer 2H-$MoSe_2$ grown by MBE

Santanu Kandar, Kamlesh Bhatt, Nand Kumar, Ashok Kapoor and Rajendra Singh*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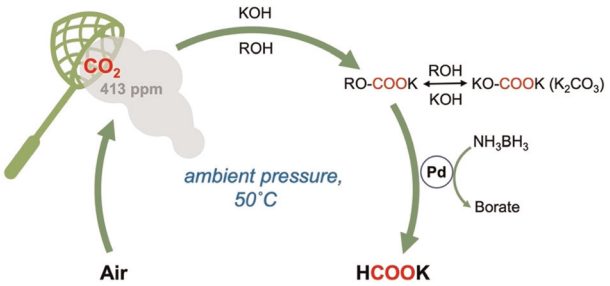
**Nanoparticle-enabled integration of air capture and conversion of $CO_2$**

Huanqin Guan, Ju Ye Kim, Kecheng Wei, Mayank Agrawal, Andrew A. Peterson* and Shouheng Sun*

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