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Nanoscale

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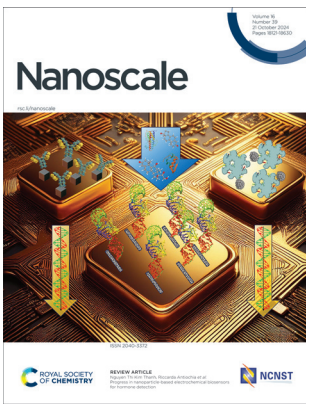

Cover
See Nguyen Thi Kim Thanh, Riccarda Antiochia *et al.*, pp. 18134–18164.

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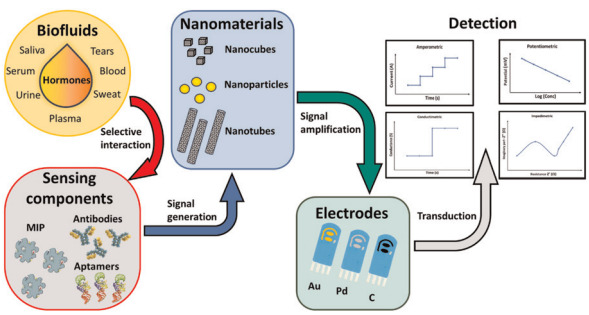
18134

Progress in nanoparticle-based electrochemical biosensors for hormone detection

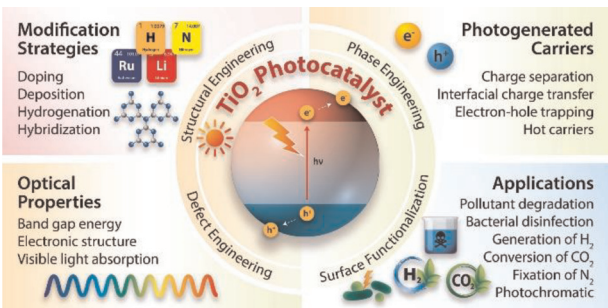
Francesco Rossi, Thithawat Trakoolwilaiwan, Valeria Gigli, Cristina Tortolini, Andrea Lenzi, Andrea Maria Isidori, Nguyen Thi Kim Thanh* and Riccarda Antiochia*



18165

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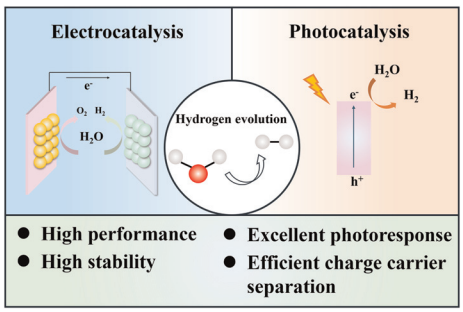
Recent advances in developing nanoscale electro-/photocatalysts for hydrogen production: modification strategies, charge-carrier characterizations, and applications

Mohammed-Ibrahim Jamesh, Haihang Tong, Shella Permatasari Santoso, Wenxin Niu, Ji-Jung Kai, Chang-Wei Hsieh, Kuan-Chen Cheng,* Fang-Fang Li, Bin Han,* Juan Carlos Colmenares and Hsien-Yi Hsu*



18251

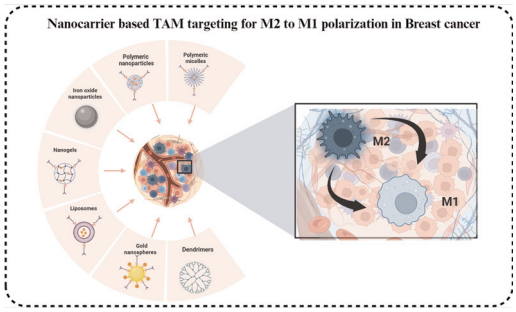
Biocompatible triboelectric energy generators (BT-TENGs) for energy harvesting and healthcare applications

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

18274

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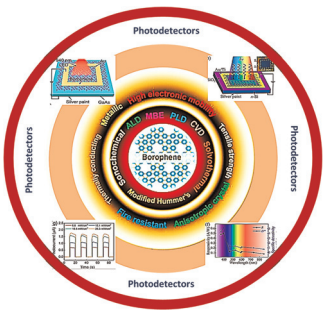
Advances in borophene based photodetectors for a sustainable tomorrow: a comprehensive review

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



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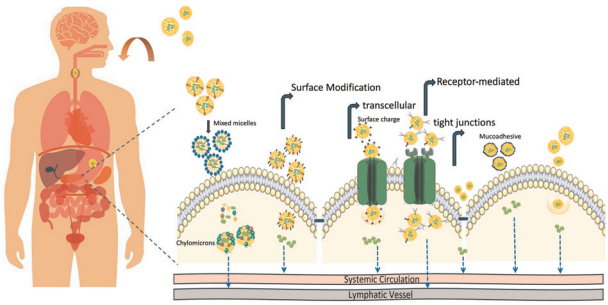

Lipid nanoparticles for enhancing oral bioavailability

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

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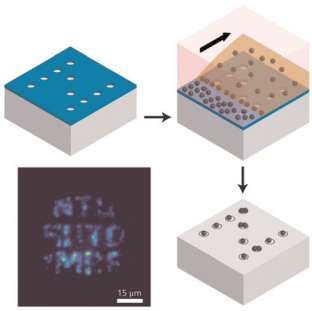
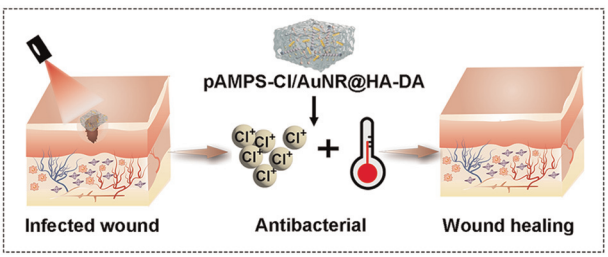


Deterministic positioning of few aqueous colloidal quantum dots

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*

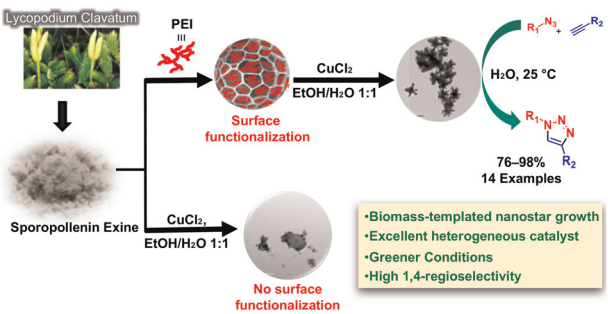
18348



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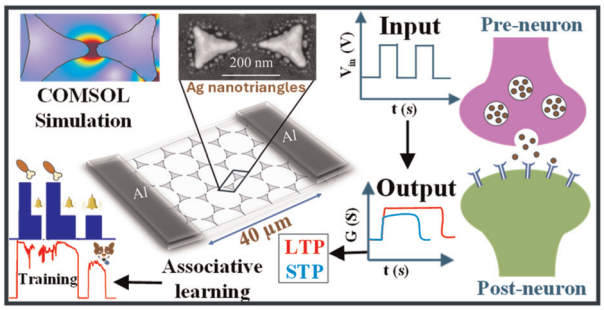
Energy-efficient resistive switching synaptic devices based on patterned Ag nanotriangles with tunable gaps fabricated using plasma-assisted nanosphere lithography

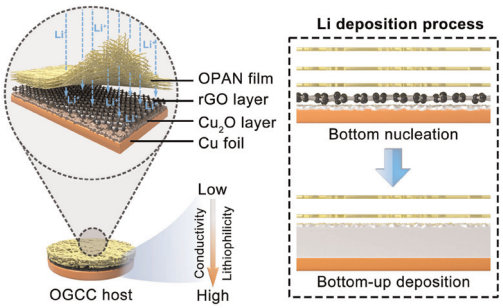
Shubham K. Mehta, Indrajit Mondal, Bhupesh Yadav and Giridhar U. Kulkarni*



18375

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

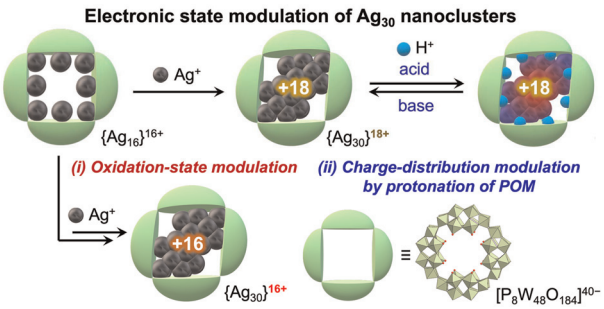
Zhuzhu Du, Xin Chen, Ying Zhao, Yuhang Liu* and Wei Ai*



18383

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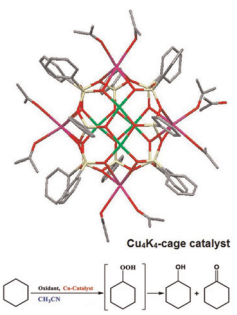
Rational (supra)molecular design and catalytic activity of cage-like Cu_4-based phenylsilsesquioxanes

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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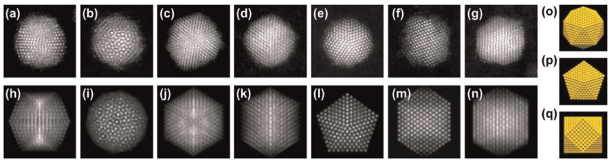

In situ heating characterization of structural evolution and size-dependent melting point depression in gold nanoclusters: a comprehensive thermodynamic investigation

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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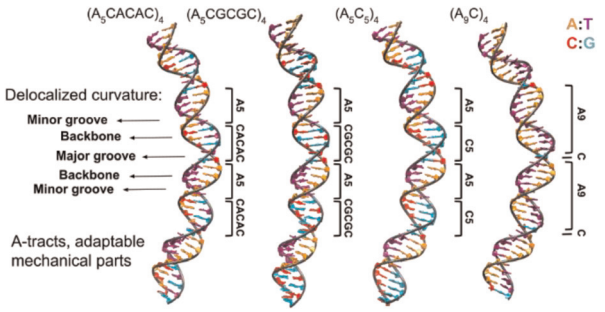

The impact of sequence periodicity on DNA mechanics: investigating the origin of A-tract's curvature

Tania Gardasevic and Agnes Noy*

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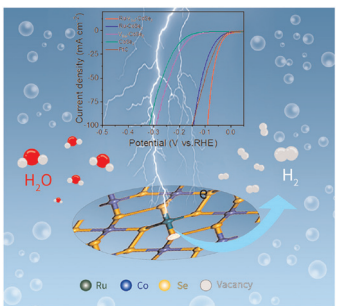

Ru incorporated into Se vacancy-containing $CoSe_2$ as an efficient electrocatalyst for alkaline hydrogen evolution

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

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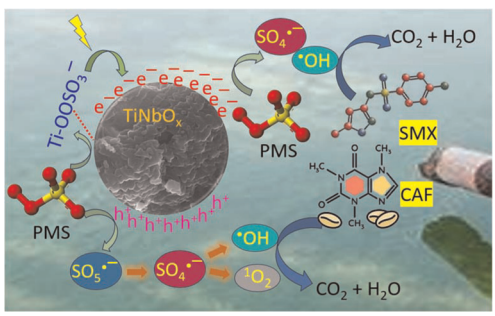

Tailored MXene-derived nano-heterostructure oxides for peroxymonosulfate activation in the treatment of municipal wastewaters

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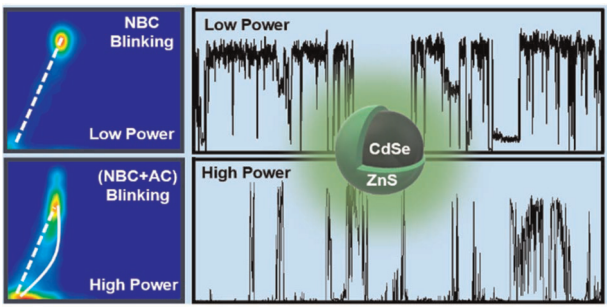
Evidence of carrier diffusion between emission states in CdSe/ZnS core–shell quantum dots: a comprehensive investigation combining fluorescence lifetime correlation spectroscopy (FLCS) and single dot photoluminescence studies

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



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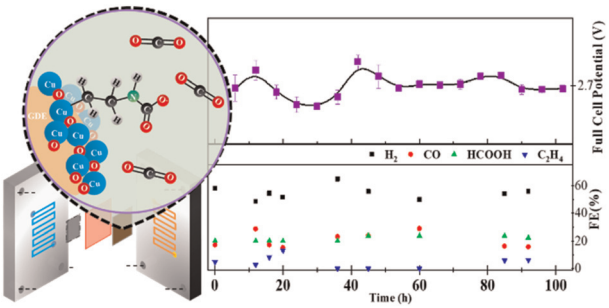
Exploring the stability and catalytic activity of monoethanolamine functionalized CuO electrode in electrochemical CO_2 reduction

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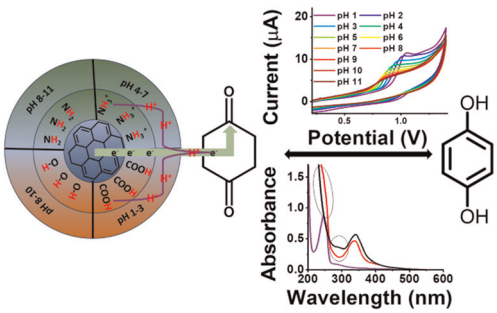
A proton-coupled electron transfer process from functionalized carbon dots to molecular substrates: the role of pH

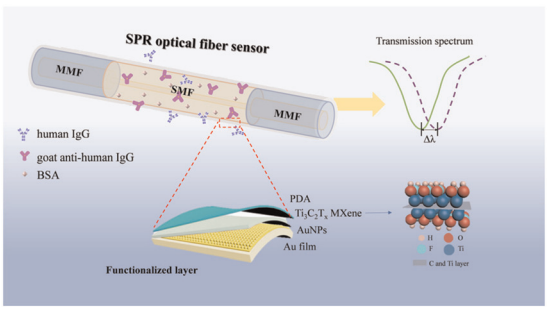
Umarfaruk S. Sayyad, Sapna Waghmare and Somen Mondal*



18477

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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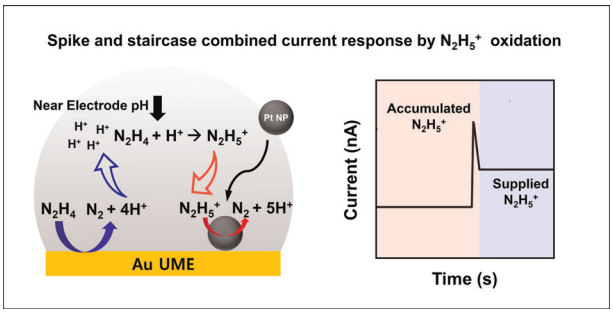

Exploring single-entity electrochemistry beyond conventional potential windows: mechanistic insights into hydrazine/hydrazinium ion oxidation

Ki Jun Kim, Yujin Han and Seong Jung Kwon*

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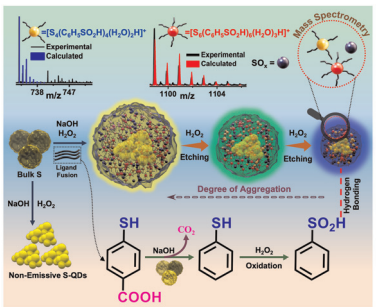

Unravelling structural insights into ligand-induced photoluminescence mechanisms of sulfur dots

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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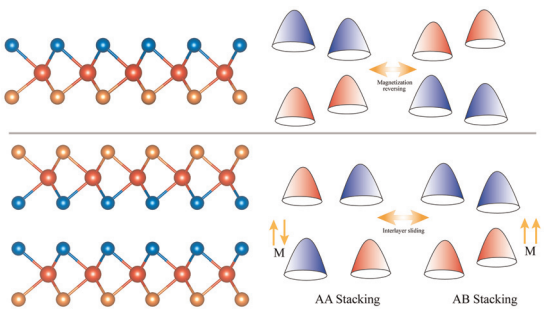
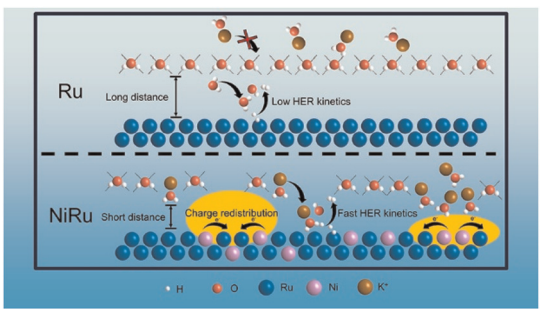


Prediction of the two-dimensional ferromagnetic semiconductor Janus 2H-ZrTeI monolayer with large valley and piezoelectric polarizations

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

18518



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

Wei He, Weihang Feng and ZhengMing Sun*

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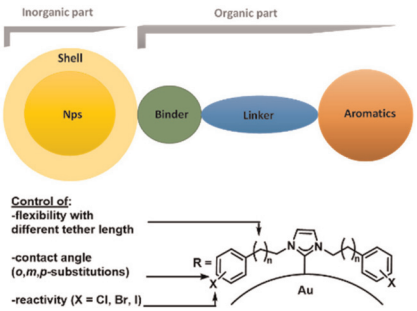
On-surface synthesis – Ullmann coupling reactions on N-heterocyclic carbene functionalized gold nanoparticles

Nathaniel Ukah* and Hermann A. Wegner



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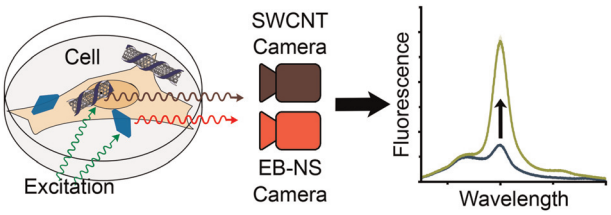
Ratiometric near infrared fluorescence imaging of dopamine with 1D and 2D nanomaterials

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



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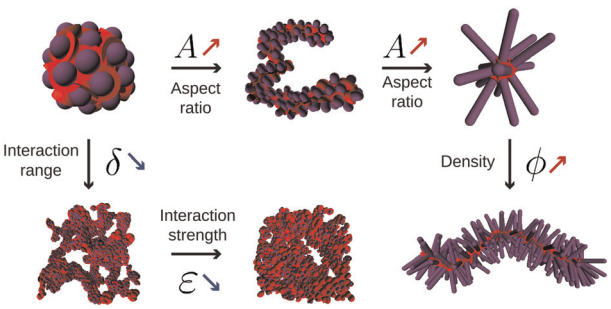
Dilute suspensions of Janus rods: the role of bond and shape anisotropy

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



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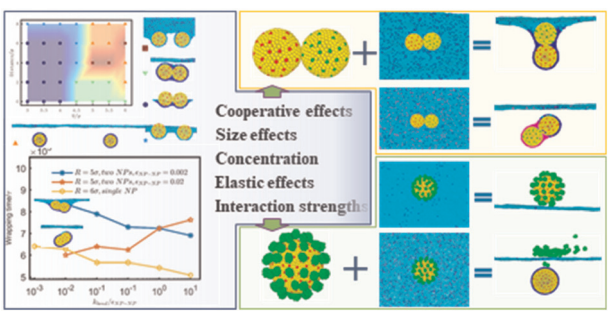
Endocytosis efficiency and targeting ability by the cooperation of nanoparticles

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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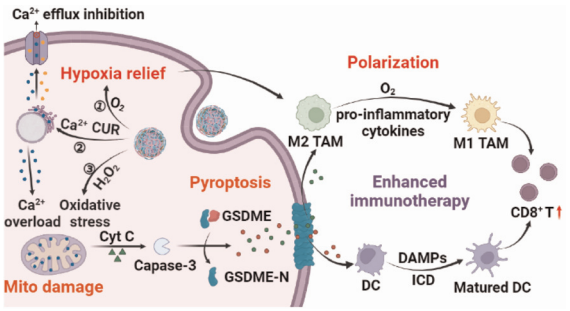

Synergistic immunotherapy with a calcium-based nanoinducer: evoking pyroptosis and remodeling tumor-associated macrophages for enhanced antitumor immune response

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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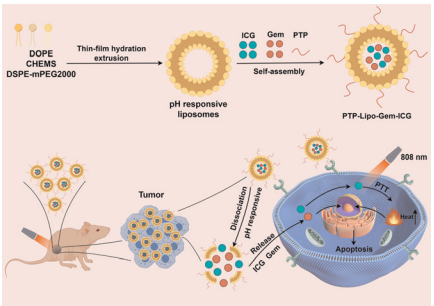
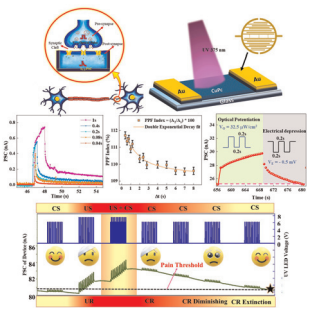


Plectin-1-targeted recognition for enhancing comprehensive therapy in pancreatic ductal adenocarcinoma

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

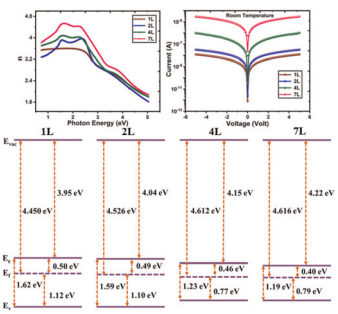
18597



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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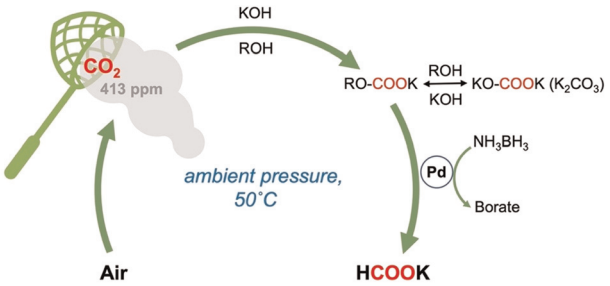
Nanoparticle-enabled integration of air capture and conversion of CO_2

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



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