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See Micah Peter Vallin and Michael Thompson Pettes *et al.*, pp. 3655–3663. Image reproduced by permission of Michael T. Pettes from *Nanoscale Adv.*, 2025, 7, 3655.

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Introduction to nanomaterials in catalysis and sensing applications

Thanh-Danh Nguyen, Dinh Quang Khieu, Nguyen Hoang Tuan and Mita Dasog



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Graphene's Frontier in aerospace: current applications, challenges, and future directions for space engineering

Praveen Kumar Kanti, Prashantha Kumar H G,* V. Vicki Wanatasanappan, Abhinav Kumar and Melkamu Biyana Regasa*

Applications



- Satellite Technology
- Thermal management
- Radiation Shielding
- Sensors and Electronics
- Communication Systems

Challenges



- Design Optimization
- Harsh Space Conditions
- Environmental Impact
- Scalability

Future directions



- Deep space mission
- Long-duration space missions
- Astronauts radiation shielding
- Energy Storage and Digital Twins



Environmental Science: Atmospheres

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Fundamental questions
Elemental answers

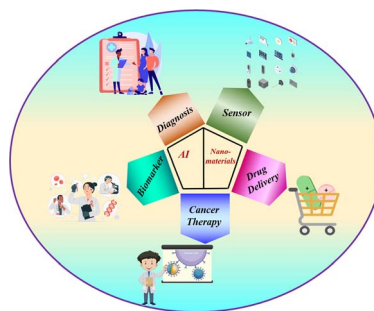


REVIEWS

3619

A review of emerging trends in nanomaterial-driven AI for biomedical applications

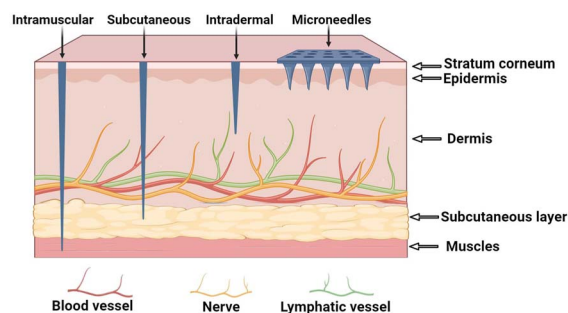
Subhendu Chakroborty,* Nibedita Nath,* Sameeta Sahoo, Bhanu Pratap Singh, Trishna Bal,* Karunesh Tiwari,* Yosief Kasshun Hailu, Sunita Singh, Pravin Kumar and Chandra Chakraborty



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Unique advantages and applications of polysaccharide microneedles as drug delivery materials and in treatment of skin diseases

Chao Liu, Meng Liu, Xin Li, Yimei Hu, Lingling Zhang, Feng-Ming You,* Gang Fan* and Yiman Ge*

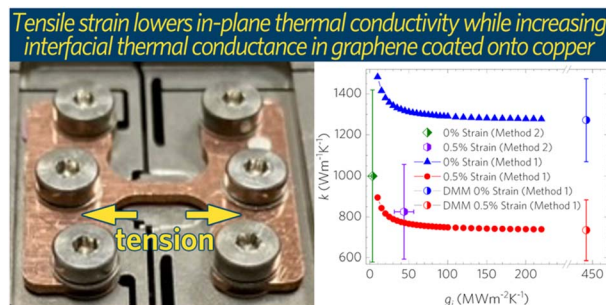


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Thermal conductivity of graphene coated copper under uniaxial tensile mechanical strain

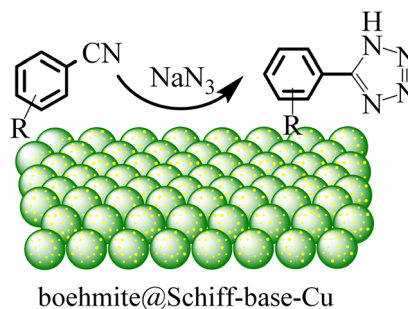
Micah P. Vallin, Hisato Yamaguchi, Rijan Karkee, Chanhoo Lee, Ramon M. Martinez, Saryu J. Fensin, Jun Beom Park, Hi Tin Vo, Richard Z. Zhang* and Michael T. Pettes*



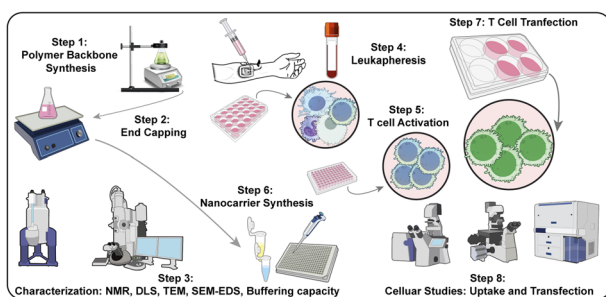
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Cycloaddition reaction of NaN₃ with nitriles toward the synthesis of tetrazoles catalyzed by a copper complex on boehmite nanoparticles

Arida Jabbari,* Bahman Tahmasbi, Elham Mohseni and Mitra Darabi



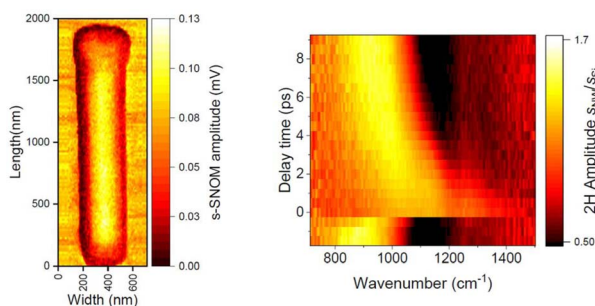
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Synthesis, characterization, and evaluation of low molecular weight poly(β -amino ester) nanocarriers for enhanced T cell transfection and gene delivery in cancer immunotherapy

Alireza Gharatape, Ali Sayadmanesh, Hamid Sadeghi-Abandansari, Hossein Ghanbari, Mohsen Basiri* and Reza Faridi-Majidi*

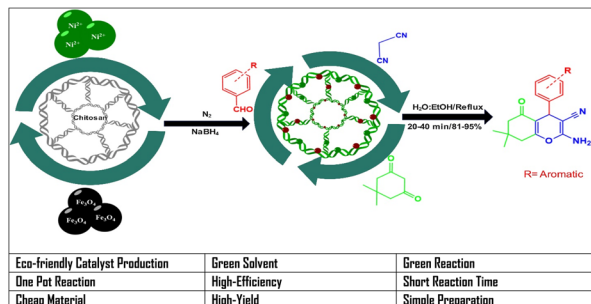
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Time-resolved nanospectroscopy of III–V semiconductor nanowires

Andrei Luferau, Alexej Pashkin,* Stephan Winnerl, Maximilian Obst, Susanne C. Kehr, Emmanouil Dimakis, Thales V. A. G. de Oliveira, Lukas M. Eng and Manfred Helm

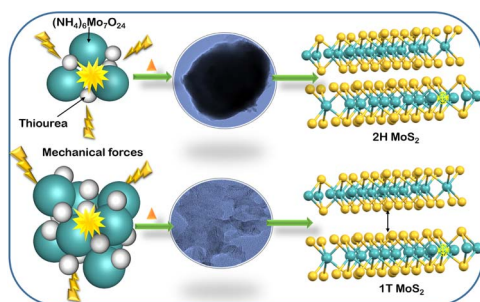
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Magnetically recoverable $\text{Fe}_3\text{O}_4@\text{chitosan}@\text{Ni}_2\text{B}$: a bio-based catalyst for one-pot green and efficient synthesis of tetrahydrobenzo[b]pyrans

Bashir Mashhourzad and Behzad Zeynizadeh*

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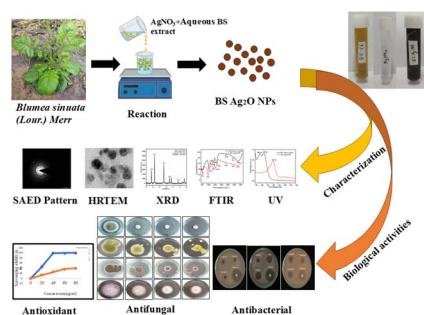
Ujjwala Chothe,* Priyanka Sumbe, Mahendra A. More, Murthy Chavali, Milind V. Kulkarni and Bharat B. Kale*



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Green synthesis and characterization of *Blumea sinuata* silver nanoparticles: antibacterial, antifungal, and antioxidant properties

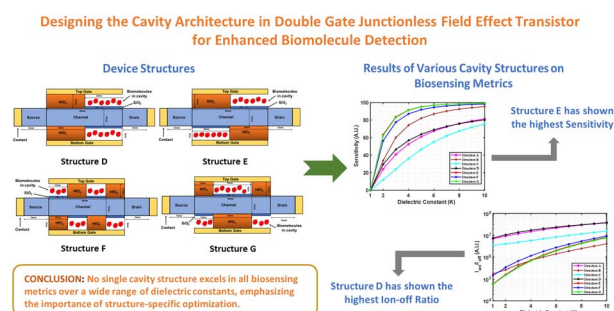
Umakant Pradhan, Jagdish Prasad Prajapati, Purusottam Majhi, Dibyasha Sahu, Rajesh Kumar Singh, Sadhucharan Mallick and Awadhesh Kumar Shukla*



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Designing the cavity architecture in double gate junctionless field effect transistors for enhanced biomolecule detection

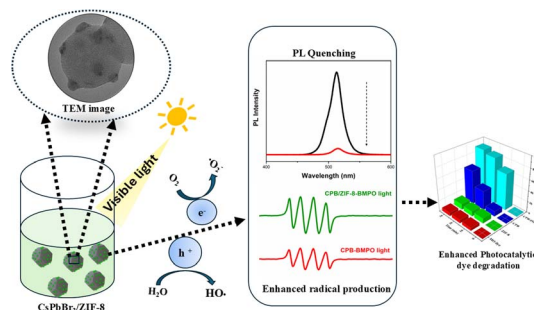
Shahriar Khan and Ehsanur Rahman*



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Synthesis of CsPbBr₃ decorated ZIF-8 nanocomposite for enhanced photocatalytic performance

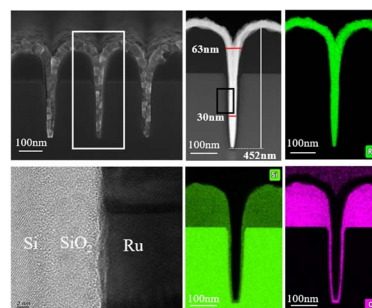
Alen Sam Thomas, Philip Nathaniel Immanuel, Neena Prasad, Achiad Goldreich, Jonathan Prilusky, Raanan Carmieli and Lena Yadgarov*



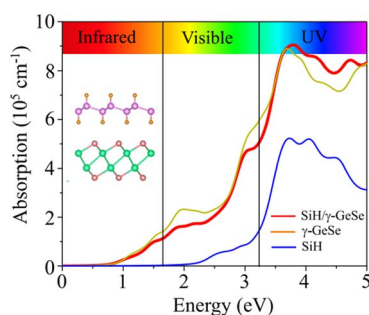
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Atomic layer deposition of Ru in nanoTSV with high coverage and low resistivity

Zhao Chen, Feifeng Huang, Biao Wang, Qiancheng Wang, Hongbin Chen, Qiu Shao, Bo Feng,* Ming Ji and Huigao Duan



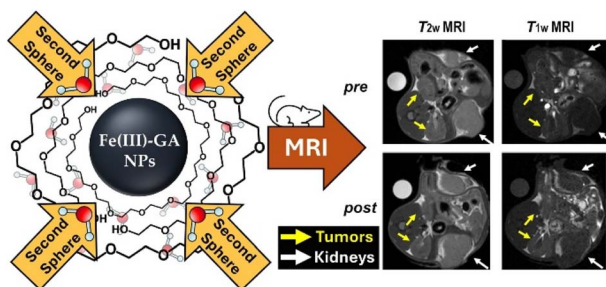
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First principles exploring the tunable electronic and optical features of silicane/ γ -GeSe heterostructures for advanced electronic devices

Nguyen P. Q. Anh, Ho V. Cuu, Truong Tan, Chuong V. Nguyen and Nguyen N. Hieu*

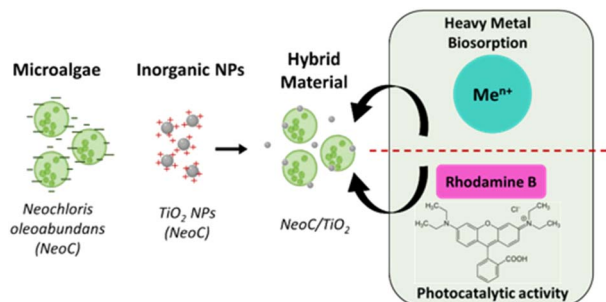
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Comprehensive relaxometric analysis of Fe(III) coordination polymer nanoparticles for T_1 -MRI: unravelling the impact of coating on contrast enhancement

Marco Ricci, Fabio Carniato, Alessia Corrado, Giuseppe Ferrauto,* Enza Di Gregorio, Giovanni Battista Giovenzana and Mauro Botta*

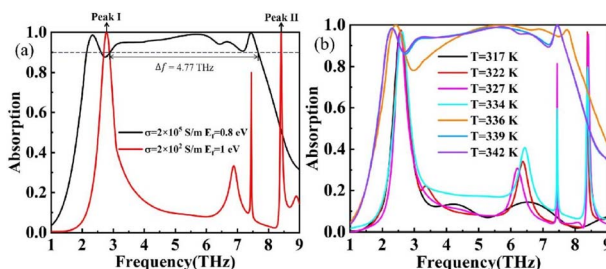
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Hybrid materials for wastewater treatment: synergistic coupling of *Neochloris oleoabundans* and TiO_2 nanoparticles

Ilaria Zanoni, Sara Amadori, Andrea Brigliadori, Anna Luisa Costa, Simona Ortellì, Pierluigi Giacò, Costanza Baldisserotto, Simonetta Pancaldi and Magda Błosi*

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Multifunctional terahertz metamaterials device based on a dual-tunable structure incorporating graphene and vanadium oxide

Wenchao Zhao,* Xiaowei Lv, Qianqian Xu, Zhengji Wen,* Yuchuan Shao, Changlong Liu and Ning Dai

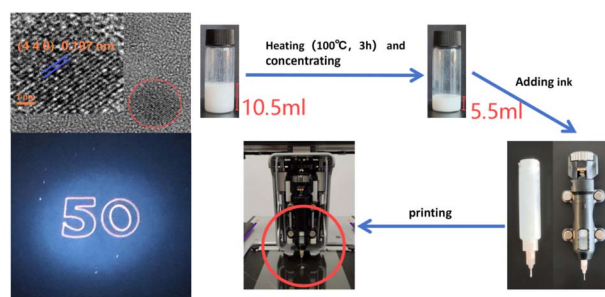


PAPERS

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Monodisperse spherical Ag^+ doped $\text{Cs}_2\text{KBiCl}_6$ nanocrystals: utilizing steric hindrance engineering for inkjet printing of anti-counterfeiting patterns

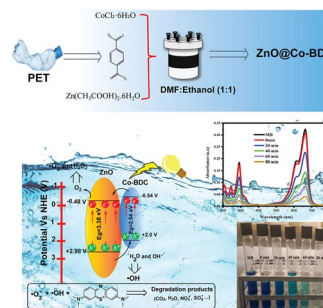
Shaoli Song, Youlun Zhu, Hanmei Jiang, Huichao He, Qian Yang, Jianbei Qiu and Tao Han*



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Enhanced photocatalytic degradation of methylene blue dye *via* valorization of a polyethylene terephthalate plastic waste-derived metal–organic framework-based ZnO@Co-BDC composite catalyst

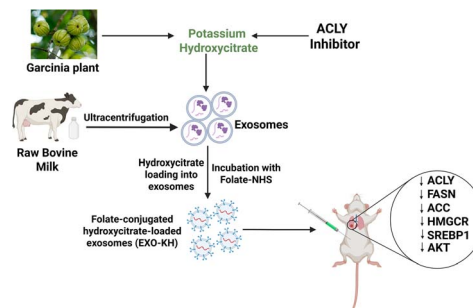
Biniyam Abdu Berehe, Ali Ahmed Desalew, Getahun Worku Derbe, Derese Moges Misganaw, Kedir Seid Mohammed,* Jia-Yaw Chang* and Wubshet Mekonnen Girma*



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Hydroxycitrate-loaded exosomes demonstrate enhanced therapeutic efficacy against lung adenocarcinoma by inhibiting the metabolic enzyme ATP citrate lyase

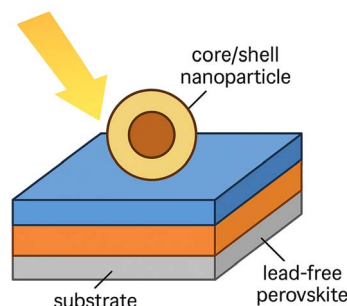
Kanika Phutela, Amanjit Bal, Navneet Singh and Sadhna Sharma*



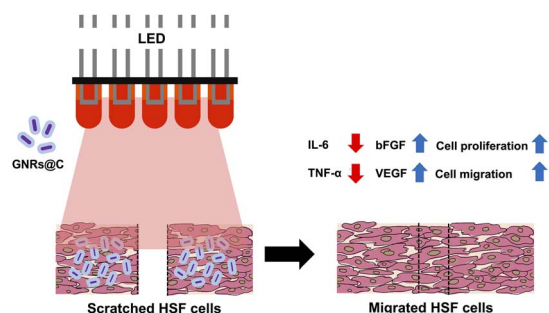
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TiN/SiO_2 core–shell refractory plasmonic nanostructures unlock unprecedented 26.7% power conversion efficiency in Pb-free perovskite solar cells

Ahmed A. Mohsen, Mohamed Zahran, S. E. D. Habib and Nageh K. Allam*



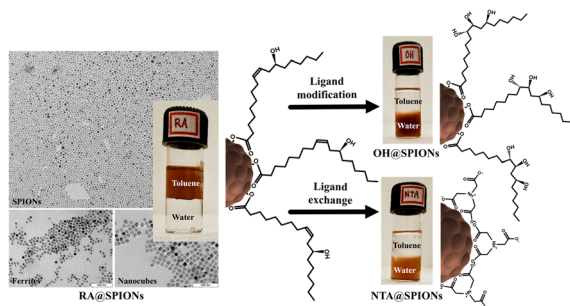
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Synergistic effect of gold nanorods coated with type I collagen and LED irradiation on wound healing in human skin fibroblast cells

Sasiprapa Poomrattanangoon and Dakrong Pissuwan*

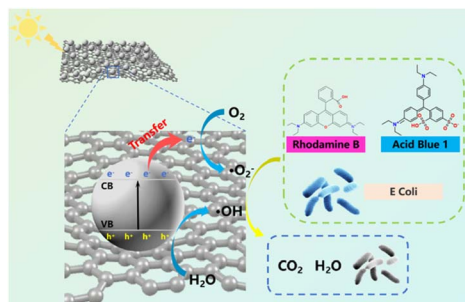
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A simple, scalable protocol for the synthesis of ricinoleic acid-functionalised superparamagnetic nanoparticles with tunable size, shape, and hydrophobic or hydrophilic properties

Sohel Reja*

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Composite aerogel membranes with well dispersed nano M-TiO₂@GO for efficient photocatalysis

Xiaozhe Zhang, Siqi Zhang, Xiaohui Mao, Yifan Liu, Yaru Li, Weilong Meng, Liping Zhu* and Meifang Zhu

