

Materials Advances

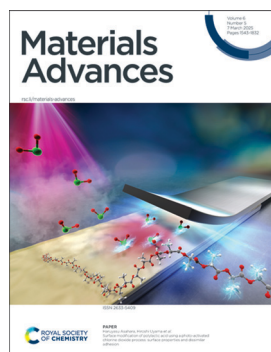
An open access journal publishing across the breadth of materials science

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 6(5) 1543–1832 (2025)



Cover

See Haruyasu Asahara, Hiroshi Uyama *et al.*, pp. 1608–1612. Image reproduced by permission of Haruyasu Asahara from *Mater. Adv.*, 2025, 6, 1608.

EDITORIAL

1552

Introduction to exploring the progress in fundamental, functional material and health aspects of melanins and related materials

A. Bernardus Mostert,* Pooi See Lee* and Carlos F. O. Graeff*

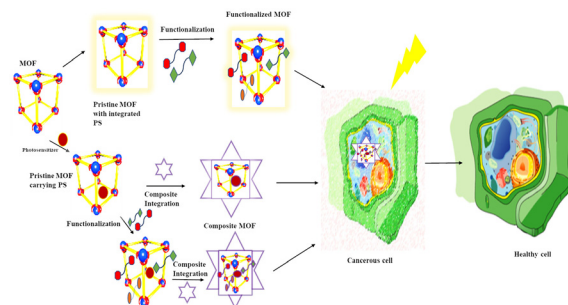


REVIEWS

1554

Metal organic frameworks in photodynamic therapy of cancer: functional roles of active metal centres and integrated and loaded photosensitizers in the framework

Temitope O. Abodunrin,* Godshelp O. Egharevba, Fisayo D. Owoeye, Johnson A. Omojola and Oluyomi S. Adeyemi



RSC Applied Polymers

The application of polymers,
both natural and synthetic

Interdisciplinary and open access



rsc.li/RSCApplPolym

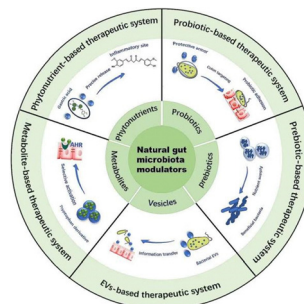
Fundamental questions
Elemental answers

REVIEWS

1578

Therapeutic systems based on natural gut microbiota modulators: the latest advances in the treatment of inflammatory bowel disease

Zelin Guan, Peilin Niu, Qichao Tan, Yidong Wang, Shujing Deng, Danyang Wang, Kai Dong,* Jianfeng Xing* and Cuiyu You*

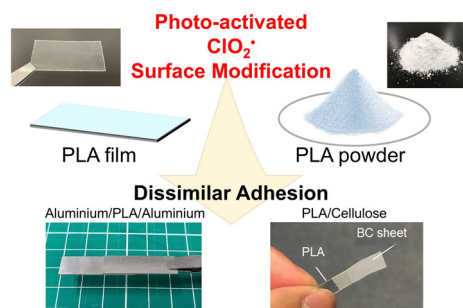


PAPERS

1608

Surface modification of polylactic acid using a photo-activated chlorine dioxide process: surface properties and dissimilar adhesion

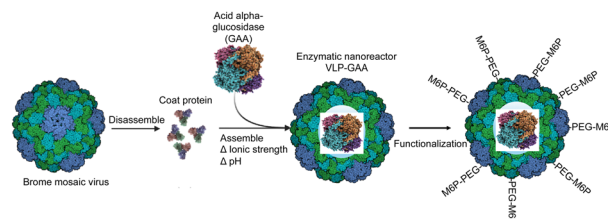
Haruyasu Asahara,* Weiting Wu, Taka-Aki Asoh, Yu-I Hsu, Tsuyoshi Inoue and Hiroshi Uyama*



1613

Virus-based enzymatic nanoreactors with acid alpha-glucosidase for the potential treatment of Pompe disease

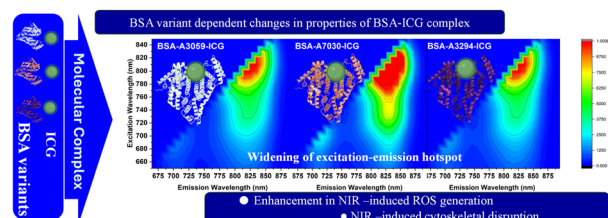
Jordan Molina-Solís, Pedro Gama, Kanchan Chauhan, Ana G. Rodríguez-Hernández and Rafael Vazquez-Duhalt*



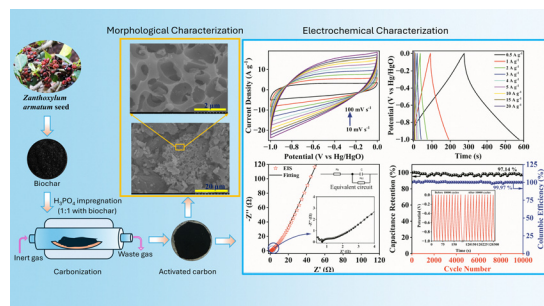
1621

Effect of bovine serum albumin (BSA) variants on the photophysical and biological properties of a NIR-responsive BSA–indocyanine green complex

Jayashree Roy, Devendra Tiwari, Sahely Saha, Raviraj Vankayala, Shanmuga Sharan Rathnam Vuppaladadiam, Abhijeet Joshi and Indranil Banerjee*



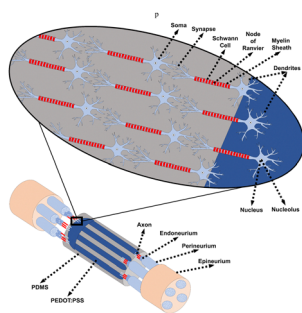
1635



Study of the electrochemical performance of *Zanthoxylum armatum* seed-derived potassium hydroxide-assisted activated carbon as a negatrod material for supercapacitor applications

Deval Prasad Bhattarai, Sabin Aryal, Khem Raj Shrestha, Pawan Kumar Mishra, Timila Shrestha, Puspa Lal Homagai, Hari Bhakta Oli* and Ram Lal (Swagat) Shrestha*

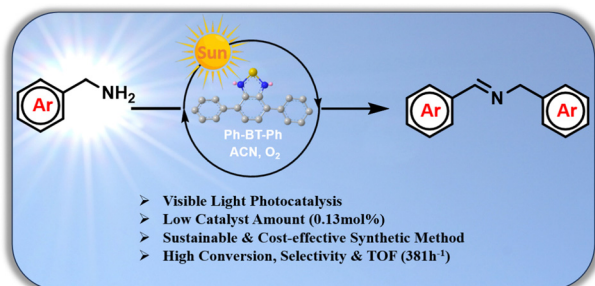
1647



PDMS-based flexible and conductive composite films containing modified PEDOT:PSS coated channels as a potential neural conduit

Orhan Gokalp Buyukuysal, Busra Kilic, Cagatay Karaaslan, Dincer Gokcen, Cem Bayram and Halil Murat Aydin*

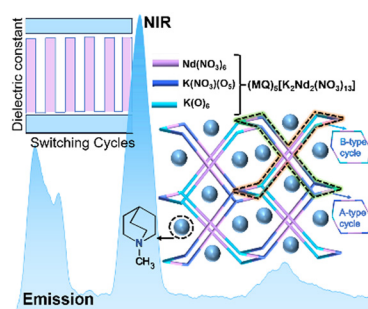
1667



Efficient oxidative coupling of amines to imines under natural sunlight using a benzothiadiazole-based molecular photocatalyst

Ajeet Singh, Bidisa Das* and Saumi Ray*

1679



An NIR-luminescent nitrate-bridged hybrid bimetal dielectric with a switchable dielectric constant

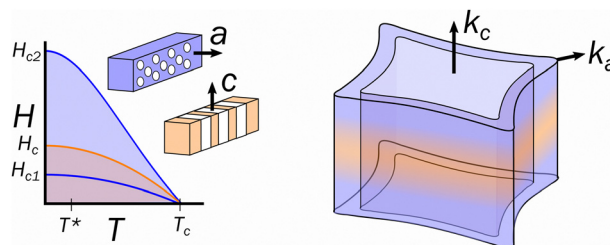
Li-Ping Wang, Lu-Lu Jiang, Zong-Ze Cui, Zheng-Hui Hu, Le-Ping Miao, Jian-Rong Li,* Heng-Yun Ye* and Chao Shi*



1685

Type I and type II superconductivity in a quasi-2D Dirac metal

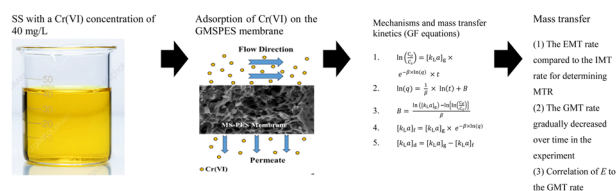
Chris J. Lygouras,* Junyi Zhang, Jonah Gautreau, Mathew Pula, Sudarshan Sharma, Shiyuan Gao, Tanya Berry, Thomas Halloran, Peter Orban, Gael Grissonnanche, Juan R. Chamorro, Taketora Mikuri, Dilip K. Bhoi, Maxime A. Siegler, Kenneth J.T. Livi, Yoshiya Uwatoko, Satoru Nakatsuji, B. J. Ramshaw, Yi Li, Graeme M. Luke, Collin L. Broholm and Tyrel M. McQueen



1695

Mass transfer kinetics of Cr(vi) adsorption on a green mussel shell-polyethersulfone membrane

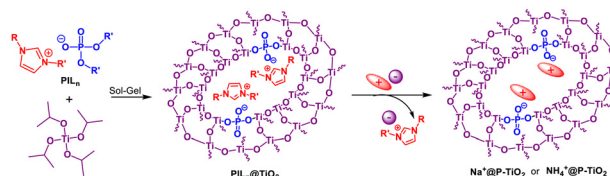
Mohamad Ali Fulazzaky,* Nur Atikah Abdul Salim, Mohd Hafiz Puteh, Tiffany Messer, Mohd Hafiz Dzarfan Othman, Ahmad Fauzi Ismail, Juhana Jaafar and Mukhlis A. Rahman



1710

Dynamic imidazolium phosphate@titanium dioxide ionogels as environmental pollutant removers

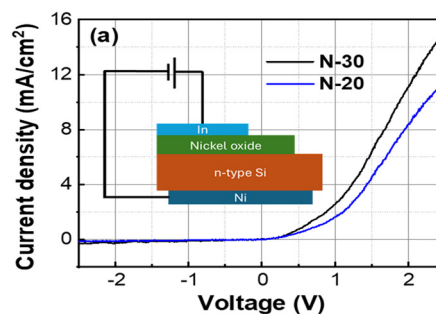
Mohamed Boundor, Nadia Katir* and Abdelkrim El Kadib*



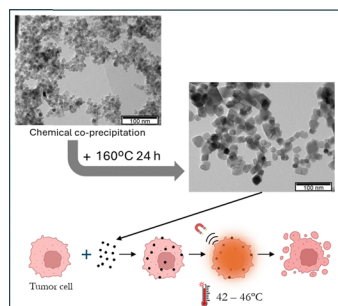
1719

Oxygen partial pressure effects on nickel oxide thin films and NiO/Si diode performance

Thi Kim Hang Pham, Bao Quan Tran, Khac Binh Nguyen, Ngoc Yen Nhi Pham, Thi Hai Yen Nguyen, An Hoang-Thuy Nguyen, Ngoc Phuong Nguyen, Hai Dang Ngo* and Hoai Phuong Pham*



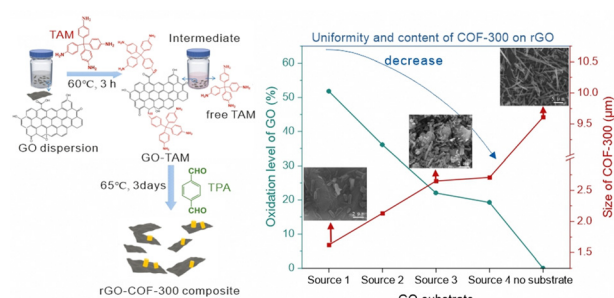
1726



Enhancing the magnetic properties of superparamagnetic iron oxide nanoparticles using hydrothermal treatment for magnetic hyperthermia application

Carla Martins, Catarina Rolo, Vanessa R. G. Cacho, Laura C. J. Pereira, João Paulo Borges, Jorge Carvalho Silva, Tânia Vieira and Paula I. P. Soares*

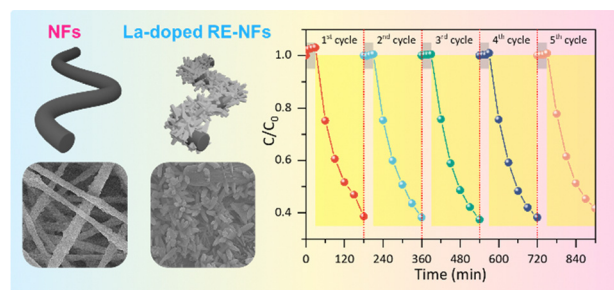
1744



The effect of the oxidation level of the graphene oxide substrate on *in situ* growth of COF-300

Ying Quan, Yizhou Yang, Qinfu Liu* and Karl Börjesson*

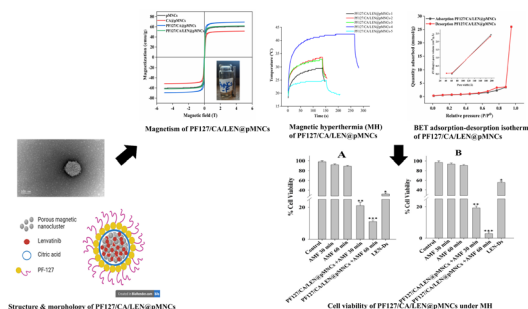
1755



3D hierarchical rare-earth metal composite nanofiber membranes for highly durable and efficient photodegradations of organic pollutants

Aditya Rianjanu,* Sephia Amanda Muhtar, Hannah Faye M. Austria, Tarmizi Taher, Noto Susanto Gultom, Wibawa Hendra Saputera, Hutomo Suryo Wasisto, Fatwa F. Abdi, Wei-Song Hung and Januar Widakdo*

1769



Novel biocompatible multifunctional porous magnetic nanoclusters for the targeted delivery of lenvatinib towards hepatocellular carcinoma

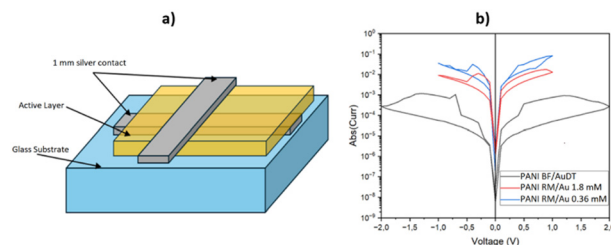
Saba Sohail, Alam Zeb, Ali H. Alamri, Adel Al Fatease, Ahmed A. Lahiq, Nabil K. Alruwaili, Salman Khan and Fakhar ud Din*



1788

Memristive behaviour of PANI/Au hybrid nanocomposites synthesized *via* various routes

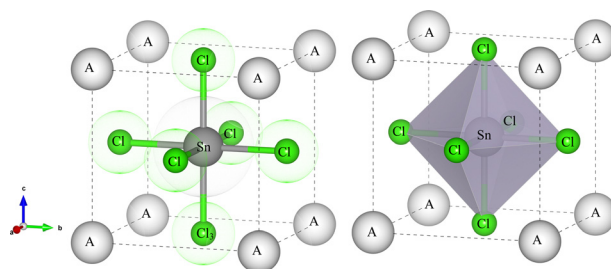
Aldobenedetto Zotti, Salvatore Aprano, Asma Rafiq, Simona Zuppolini,* Mauro Zarrelli, Maria Grazia Maglione, Paolo Tassini, Antonio Cassinese and Anna Borriello



1794

Pressure-induced multi-functional property analysis of lead-free tin based halide perovskites ASnCl_3 (A = Ga, In, Tl) for advanced optoelectronic applications

Md. Ratul Hasan, Imtiaz Ahamed Apon,* Md. Mafidul Islam,* Asab Uzzaman Azad, Md. Soleyman and Md. Salman Haque



1822

Gigantic enhancement of optoelectrical properties in polythiophene thin films *via* MoS_2 nanosheet-induced aggregation and ordering

Mitu Chauhan, Anand Kumar Singh, Vivek Chaudhary, Rajiv Kumar Pandey and Arun Kumar Singh*

