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研究论文

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Vol. 35 No. 1 February 2022

Cover Story

Organic Photoelectric Synaptic Materials, Devices and Applications

GUO Yanbo, LIU Gang

Journal of Functional Polymers, 2022, 35(1): 5-18.

Organic semiconductors (OSCs) with the advantages of molecular diversity, good mechanical flexibility and biocompatibility are important material carriers for the construction of high-performance photoelectric neuromorphic devices. Based on the molecular design and cutting-edge optoelectronic characteristics of OSCs, this review introduces the latest developments of organic semiconductors for bionic visual perceptive computing applications, and discusses their current challenges and future development prospects.

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Vol. 35 No. 1 February 2022

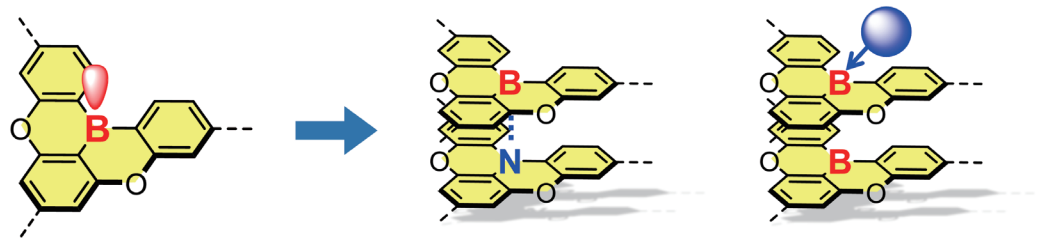
Highlights

Supramolecular Polymers Based on Planar Organoboranes

LI Zeyi, DOU Chuandong

Journal of Functional Polymers, 2022, 35(1): 1-4.

Great progress has been made in the research field of supramolecular polymers. Meijer group and Yamaguchi group reported the frustrated Lewis pair (FLP) as a new driving force for supramolecular copolymers. Yamaguchi group disclosed the double-trap metastable state as an alternative strategy to achieve dynamic and controllable supramolecular polymerization.



■ Planar organoboranes

➢ Frustrated Lewis pairs for supramolecular copolymers

➢ Dual trapping strategy for supramolecular polymers

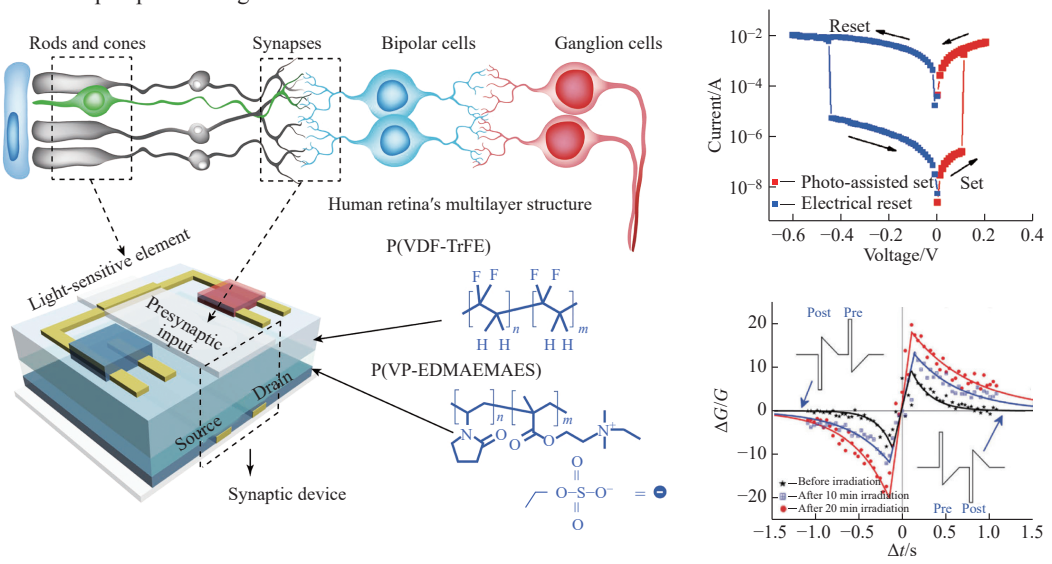
Invited Reviews

Organic Photoelectric Synaptic Materials, Devices and Applications

GUO Yanbo, LIU Gang

Journal of Functional Polymers, 2022, 35(1): 5-18.

Organic materials are the important material carriers for the construction of high-performance optoelectronic synaptic devices. The latest development of organic materials in optoelectronic devices and visual bionics are introduced, and the current application challenges and future prospects of organic materials are discussed.

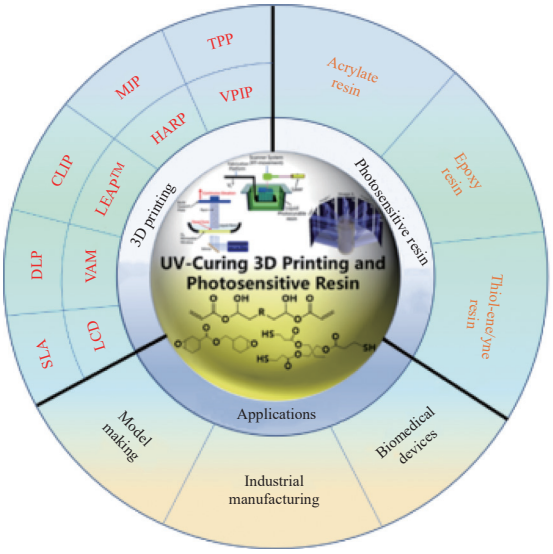


Development and Applications of UV-Curing 3D Printing and Photosensitive Resin

WANG Shichong, ZHU Yuwei, WU Yao, XIANG Hongping, LIU Xiaoxuan, PENG Zhongquan, RONG Minzhi, ZHANG Mingqiu

Journal of Functional Polymers, 2022, 35(1): 19-35.

The graphic abstract shows that multifarious UV-curing 3D printing technologies, diverse photosensitive resins and their applications



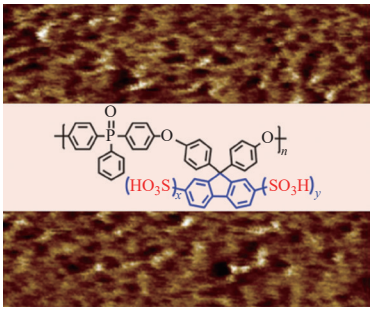
Papers

Synthesis and Characterization of Poly(arylene ether phosphine oxide)s with Pendent Sulfonated Fluorenyl as Proton Exchange Membranes

FU Zhinan, TAN Yunlong, XAIO Guyu, YAN Deyue

Journal of Functional Polymers, 2022, 35(1): 36-43.

The side-chain-type sulfonated poly(arylene ether phosphine oxide)s are prepared as proton exchange membranes by post-sulfonation. The side sulfonic acid groups of which promote the increase of proton conductivity, the decrease of swelling, and the achievement of excellent overall properties.

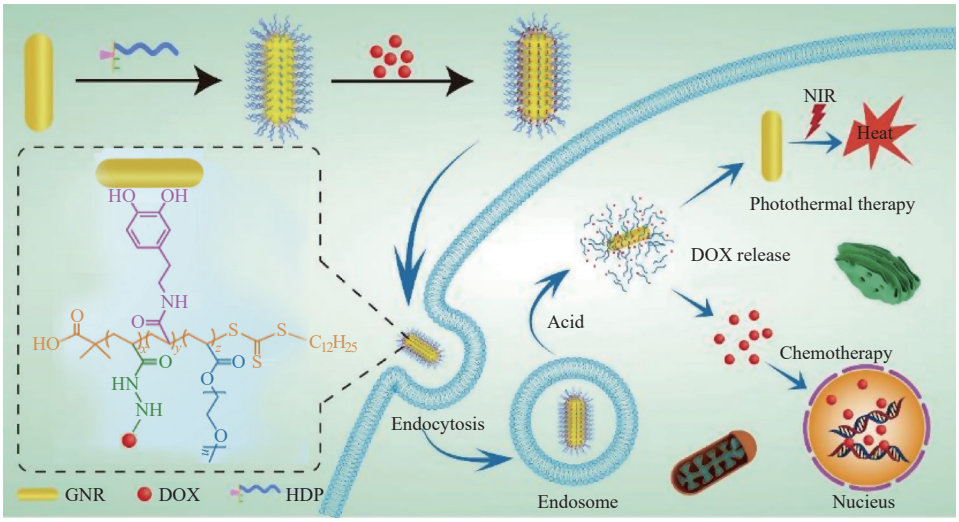


Preparation of Stimulus-Responsive Copolymer-Decorated Gold Nanorods and Their Anti-Tumor Effect

GUO Min, HOU Guanghui, XU Weijun, QIAN Junmin

Journal of Functional Polymers, 2022, 35(1): 44-53.

A multifunctional triblock copolymer, poly(acryl hydrazide)-*b*-poly(*N*-(3,4-dihydroxyphenylethyl) acrylamide)-*b*-poly(monomethoxypolyethylene glycol acrylate) (HDP), was designed and synthesized for decorating gold nanorod (GNR). The obtained GNR-based nanoplatform was able to achieve chemotherapeutic drug delivery and efficient combined photothermal-chemotherapy of breast cancer.

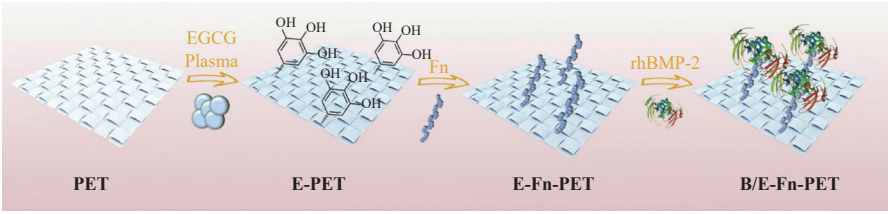


Construction and Osteogenic Properties of Plasma-Assisted Nano-Coating

GUO Ximeng, JIN Lili, LI Chunwang, HE Hongyan, LIU Changsheng

Journal of Functional Polymers, 2022, 35(1): 54-60.

In this study, functional molecules such as epigallocatechin-3-gallate (EGCG), fibronectin (Fn), and bone morphogenetic protein-2 (rhBMP-2) were sequentially immobilized by adsorption on the inert polyethylene terephthalate (PET) film to form the bioactive matrix. The surface-modified B/E-Fn-PET matrix not only exhibits excellent cell compatibility, but also offers high osteoinduction. Predictably, this integrated nano-coating strategy will provide technical support for designing the insert implantable surface with high bioactivities.

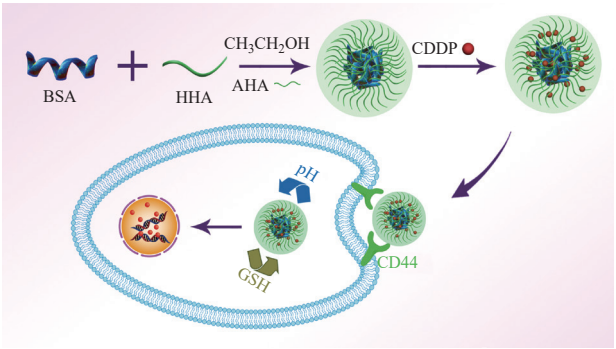


Preparation of Albumin/Hyaluronic Acid Composite Nanoparticles for Cisplatin Delivery

WANG Taibing, LI Ying, JIA Zhuohan, GUO Min, XU Weijun, QIAN Junmin, SUO Aili

Journal of Functional Polymers, 2022, 35(1): 61-67.

Albumin/hyaluronic acid nanoparticles can load cisplatin efficiently and release it in response to the reductive/acidic microenvironment inside HepG2 cells, thus killing them.

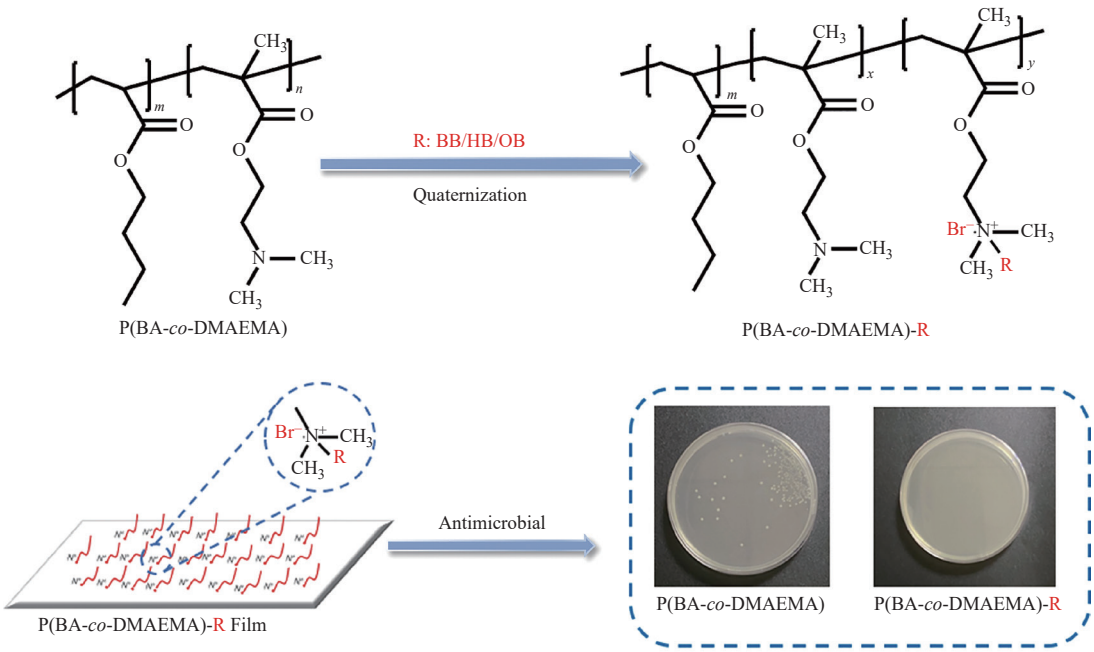


Preparation and Characterization of Acrylic Quaternary Ammonium Salt Copolymer Films

WANG Youchang, LIANG Wencheng, FAN Yao, GONG Chenyu, LANG Meidong

Journal of Functional Polymers, 2022, 35(1): 68-76.

The acrylic quaternary ammonium salt copolymers P(BA-*co*-DMAEMA)-R with different length alkanes(R: bromine butane (BB), bromo hexane (HB), and bromine octane (OB)) were prepared by quaternization. Then, P(BA-*co*-DMAEMA)-R films were fabricated through tape casting method. P(BA-*co*-DMAEMA)-R films possessed excellent antimicrobial activity based on contact-killing, without releasing bactericidal agents, which would be used in packaging materials in the future.

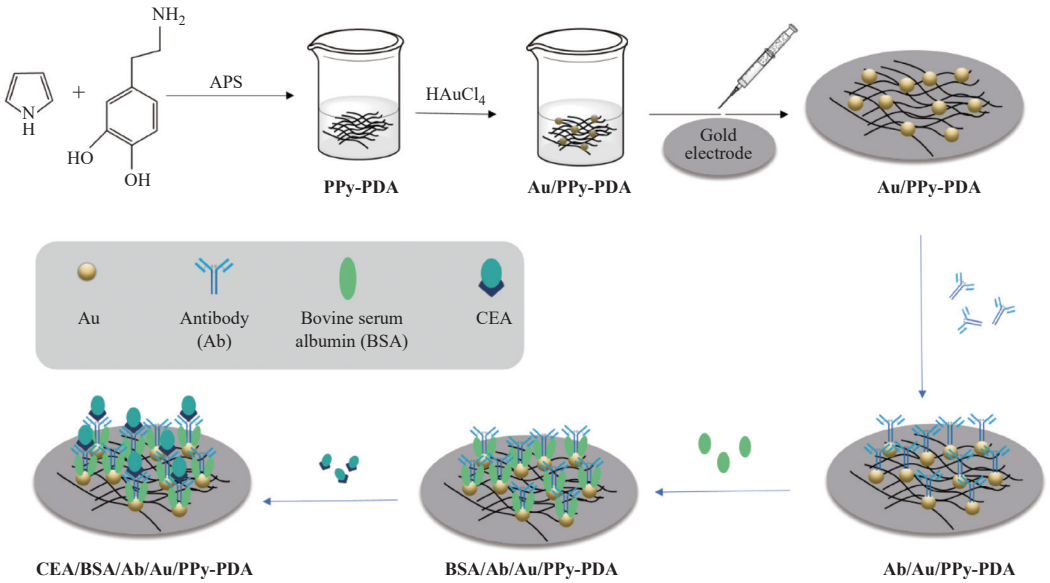


Electrochemical Immunosensor Based on Gold Nanoparticles/Polypyrrole-Polydopamine

QU Chunbo, ZHANG Jingyi, NA Lixin, LUO Jing

Journal of Functional Polymers, 2022, 35(1): 77-84.

A novel impedimetric immunosensor was fabricated for the determination of carcino-embryonic antigen (CEA) using conductive and adhesive bio-inspired gold/polypyrrole-polydopamine nanocomposites as an immobilization matrix.

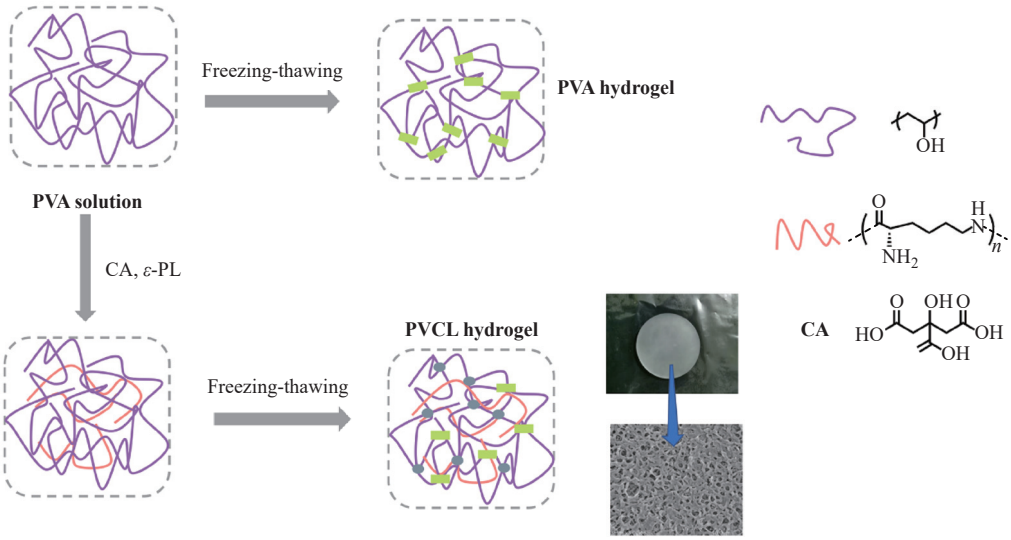


Preparation and Properties of Polyvinyl Alcohol/ε-Polylysine Hydrogel Wound Dressing

FAN Yao, LIANG Wencheng, WANG Youchang, LANG Meidong

Journal of Functional Polymers, 2022, 35(1): 85-92.

Composite hydrogels were prepared by introducing citric acid (CA) and ε-polylysine (ε-PL) into polyvinyl alcohol (PVA) by freeze-thawing method. The composite hydrogels have excellent antibacterial properties, hemocompatibility and biocompatibility.



Preparation and Properties of Temperature-Responsive Hydrogels Based on Acylhydrazone Reversible Covalent Bonds

HE Yuan, LUO Yuanyuan, LIU Tong, ZHANG Yinshan, GUO Zanru, ZHANG Jiali

Journal of Functional Polymers, 2022, 35(1): 93-100.

pH/thermo-dual responsive hydrogels were formed by the acyl hydrazone dynamic bonds between polymers and adipic dihydrazide, and their stability, self-healing and controlled release for Dox were tuned by temperature.