

功能高分子学报

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JOURNAL OF FUNCTIONAL POLYMERS

Vol. 33 No. 6 December 2020

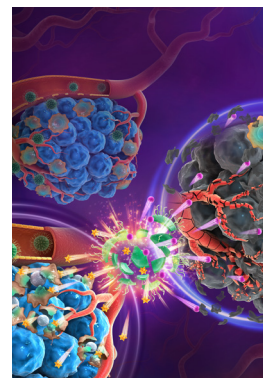
Cover Story

Co-Bonded Vascular Disrupting Agents and BLZ945 Polymeric Nanodrug for Synergistic Cancer Therapy

WANG Yue, SHEN Na, WEI Qi, TANG Zhaohui

Journal of Functional Polymers, 2020, 33 (6) : 522–531.

The nanodrug in the center is a polymer-drug conjugate that CA4 and BLZ945 are co-loaded. Due to the low permeability of nanodrugs in solid tumors, these nanodrugs mainly distribute around the tumor blood vessels. Subsequently, CA4, as a small molecular vascular disrupting agent, is released from the nanodrugs, and then selectively destroys the vasculature of solid tumors, resulting in extensive tumor necrosis. At the same time, BLZ945, as an inhibitor of CSF-1R, is released around the tumor blood vessels, inducing the apoptosis of M2-like phenotype macrophages (M2-TAMs) whose tumor infiltration is increased due to CA4 treatment, thereby reducing the amount of M2-TAMs in the tumor, reversing the immunosuppressive microenvironment, and then resulting in a synergistic cancer therapy.



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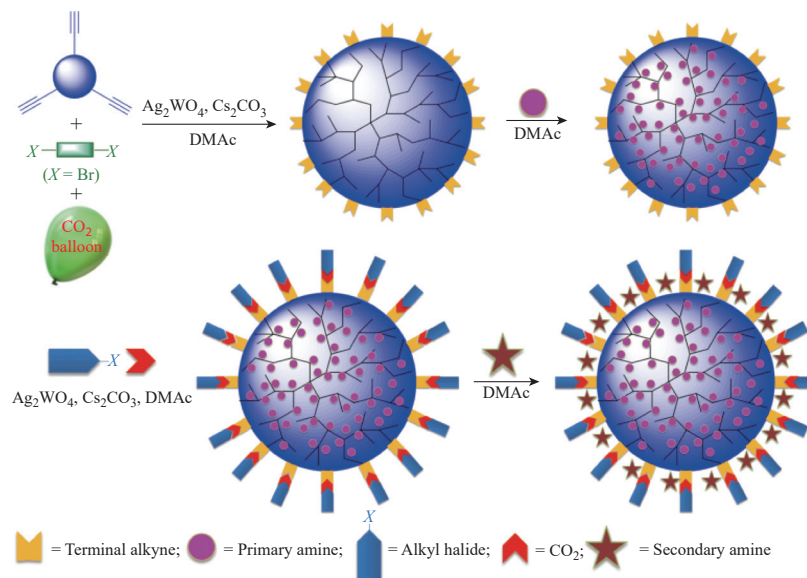
Highlights

CO₂-Based Hyperbranched Poly(alkynoate)s: A Platform Polymer for Diverse Functionalizations

ZHANG Xinghong

Journal of Functional Polymers, 2020, 33 (6) : 515–518.

Hyperbranched poly(alkynoate)s, constructed by the carbon dioxide-based polymerization, could be used as a versatile platform for site-selective multi-step functionalizations to further construct polyprodrug amphiphiles with high drug loading content, artificial light-harvesting system with high energy transfer efficiency and white light-emitting system.

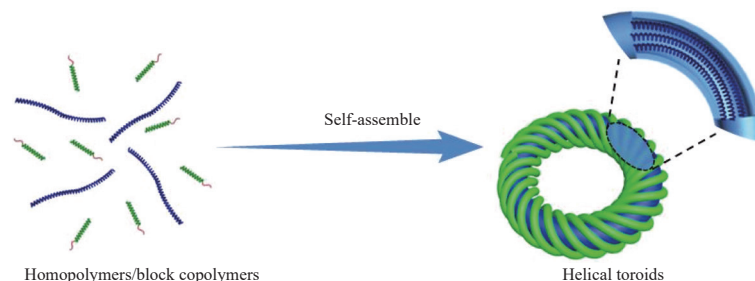


Cooperative Self-Assembly of Polypeptide Homopolymer/Block Copolymer into Helical Nanotoroids

MA Chen, HUANG Xiaoyu

Journal of Functional Polymers, 2020, 33 (6) : 519–521.

A binary system, containing polypeptide homopolymer and its block copolymer, can hierarchically self-assemble into helical nanotoroids in solution. The formation of the helical toroids is a successive two-step process. First, the homopolymers aggregate into fibrils and convolve into toroids. Second, the block copolymers self-assemble on the homopolymer toroids and result in helical surface patterns.



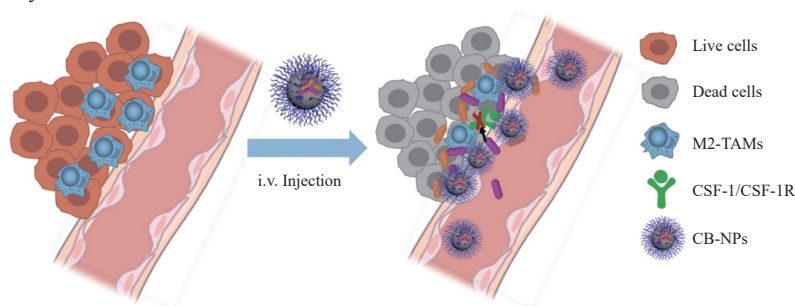
Papers

Co-Bonded Vascular Disrupting Agents and BLZ945 Polymeric Nanodrug for Synergistic Cancer Therapy

WANG Yue, SHEN Na, WEI Qi, TANG Zhaohui

Journal of Functional Polymers, 2020, 33 (6) : 522–531.

A co-bonded nanodrug poly(L-glutamic acid)-g-methoxy poly(ethylene glycol)-combretastatin A4/BLZ945 was developed. The nanodrug can enhance tumor targeting ability of BLZ945, attenuate immunosuppressive microenvironment and improve its synergistic anti-tumor ability with combretastatin A4.

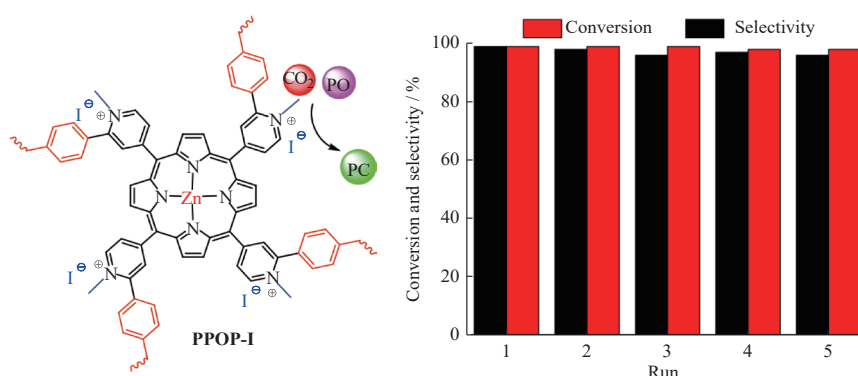


CO₂ Adsorption and Catalytic Performance of Porphyrin-Based Porous Organic Polymers

LIU Cheng, LI Guoning, ZHANG Manxia, WENG Zhihuan, JIAN Xigao

Journal of Functional Polymers, 2020, 33 (6) : 532–539.

The quaternary ammonium salt ion pairs and metal active centers were introduced into the porous organic polymer, which greatly promoted the CO₂ cycloaddition reaction and presented high selectivity and conversion above 99% using propylene oxide as the catalyst under mild conditions (80 °C, 0.3 MPa CO₂).

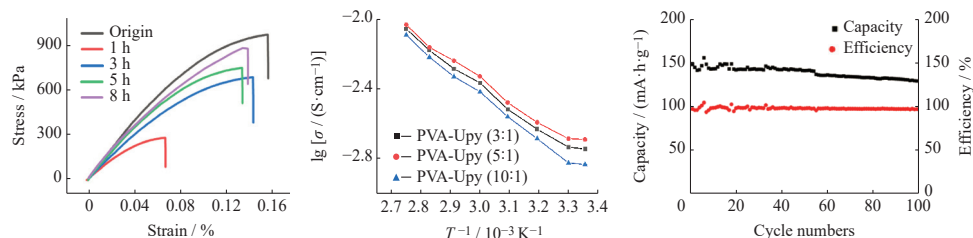


Self-Healing Electrolyte Material Based on Quadruple Hydrogen Bond

LIANG Zijia, LI Yu, FENG Wei

Journal of Functional Polymers, 2020, 33 (6) : 540–546.

PVA-Upy is a self-healing electrolyte with excellent self-healing efficiency and ionic conductivity, and has been assembled as LiFePO₄/PVA-Upy/Li cell, showing high cycle stability and thereby indicating its application prospect in lithium ion batteries.

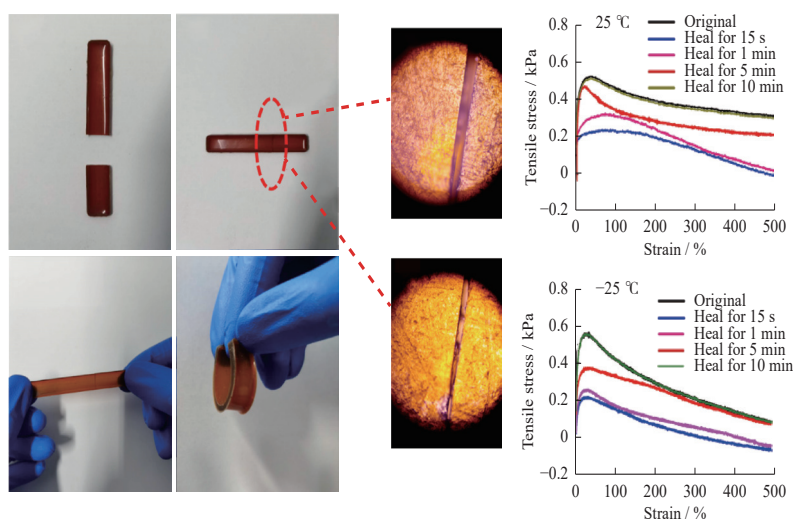


Low-Temperature Self-Healing Polymer Based on Hydrogen Bonding Crosslinking

GAO Long, YU Huitao, WANG Jian, FENG Yiyu, FENG Wei

Journal of Functional Polymers, 2020, 33 (6) : 547–553.

The reversible fracture and formation of multiple hydrogen bonds promote the rapid self-healing of polymer materials at room temperature and the effect of efficient self-healing at low temperature.

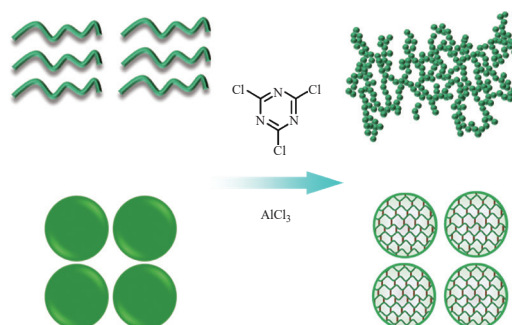


Design and Preparation of Polystyrene-Based Porous Polymers with Triazine Crosslinker

QIU Yuqian, LIU Qianhui, HAN Haojie, YU Tao, WANG Hongqiang, XU Fei

Journal of Functional Polymers, 2020, 33 (6) : 554–562.

Triazine crosslinking structure was constructed in polystyrene to prepare hypercrosslinked porous polymers. Hierarchically 3D network-structured and spherical porous polymers were fabricated using linear polystyrene and pre-crosslinked polystyrene spheres as raw materials, respectively.

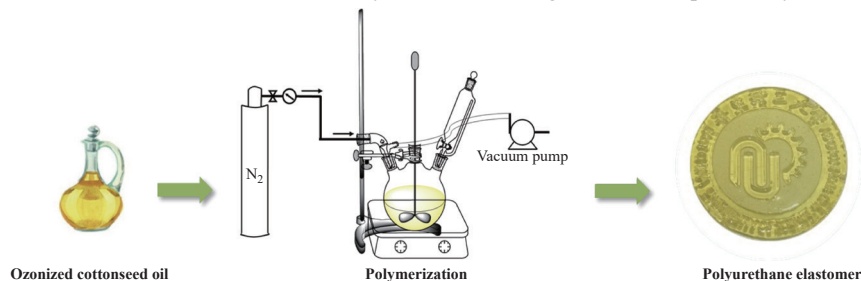


Synthesis and Properties of Cottonseed Oil-Based Polyurethane Elastomer

LI Jia, XU Zhimei, XI Zhenhao, ZHAO Ling

Journal of Functional Polymers, 2020, 33 (6) : 563–569.

Cottonseed oil-based polyurethane elastomer synthesized from high hydroxy value cottonseed oil-based polyols and primary alcohol obtained by ozone oxidation shows excellent thermal stability and tensile strength, and the improved crystalline property.

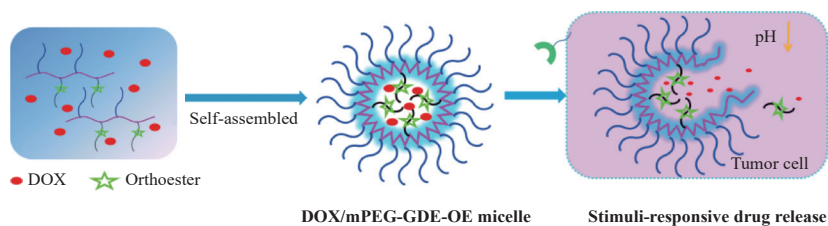


Preparation and Drug Delivery of pH-Sensitive Polymeric Micelles mPEG-GDE-OE

SUN Hui, WANG Fei, WANG Yunyun, GONG Kai

Journal of Functional Polymers, 2020, 33 (6) : 570–579.

A pH-sensitive polymeric micelles based on polyethylene glycol-polyorthoesters brush-type copolymer was prepared for drug delivery carrier. DOX-HA-OE drug-loaded micelles exhibited pH-sensitive behaviour and had enhanced cytotoxicity in MCF-7 cells and Hela cells. These novel polymeric micelles have great promise as an effective and safe carrier for antitumor drug delivery.

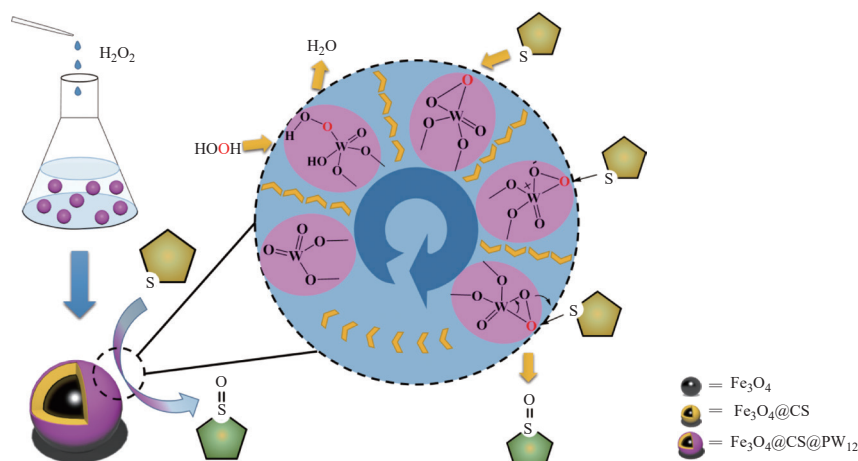


Magnetic Chitosan-Supported Polyoxometalates and Its Catalytic Oxidation of Tetrahydrothiophene

LIU Yefeng, LYU Ying, LI Ruiqi, ZUO Peng, WANG Ruixin

Journal of Functional Polymers, 2020, 33 (6) : 580–588.

The as-prepared $\text{Fe}_3\text{O}_4@\text{CS}@\text{PW}_{12}$ by loading PW_{12} onto the magnetic chitosan carrier ($\text{Fe}_3\text{O}_4@\text{CS}$) can effectively and selectively activate H_2O_2 under mild conditions for catalytic oxidation of tetrahydrothiophene (THT) into THTO. The carrier promoted the catalytic activity of PW_{12} to some extent.

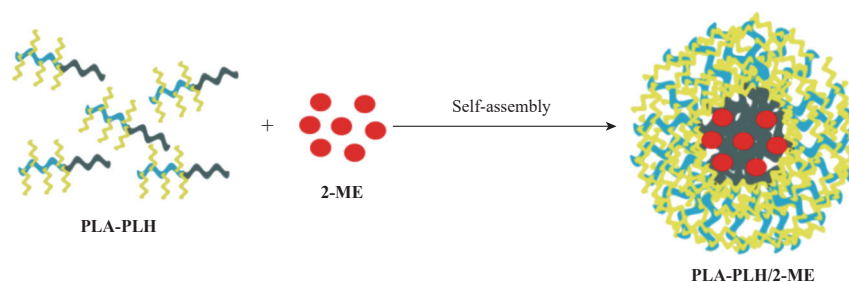


A Novel Oral Drug Delivery Carrier Based on Polylactide-Polyhistidine

YI Cuicui, MA Mengya, WU Chaohui, WANG Jinfeng, ZHANG Zhenzhong, REN Xueling

Journal of Functional Polymers, 2020, 33(6) : 589–597.

An amphiphilic polylactide-polyhistidine (PLA-PLH) block copolymer was synthesized as potential oral drug carrier for carcinoma chemotherapy. 2-Methoxyestradiol (2-ME) was loaded into PLA-PLH. A nano-drug delivery system PLA-PLH/2-ME was obtained. PLA-PLH could efficiently enhance the cellular uptake and cytotoxicity of 2-ME and reduce the drug degradation in the gastrointestinal tract.



Cross-Linked Ethylene/Propylene Copolymer Based on Reversible Dynamic Covalent Chemistry

LIU Shuhui, NIU Hui

Journal of Functional Polymers, 2020, 33(6) : 598–604.

Ethylene/propylene copolymers with cross-linking structure are constructed via thermoreversible Diels-Alder reaction between the furyl groups on the copolymer and the bismaleimide molecule, which renders the cross-linked materials with repeatable processability.

