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# JOURNAL OF FUNCTIONAL POLYMERS

Vol .32 No .1 February 2019

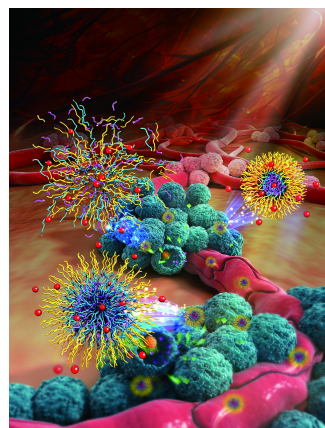
Cover Story

## Functional Polypeptide Nanogels

JIANG Zhongyu, LIU Yixuan, FENG Xiangru, DING Jianxun

*Journal of Functional Polymers*, 2019, 32(1): 13-27.

Polypeptide nanogels are nanosized polypeptide networks crosslinked by covalent bonds or physical interactions. The endogenous or exogenous stimuli trigger the physical or chemical transition of smart polypeptide nanogels, e.g., shrinking, swelling, or disassembly, which enables the on-demand drug release. The functional polypeptide nanogels show the promising application in precision medicine.



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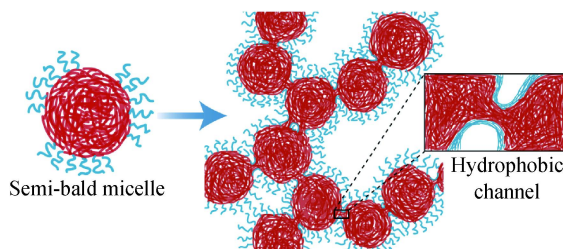
## Highlights

Structure Studies of Injectable Physical Thermogel : Semi-bald Micelle and Corresponding Percolated Micelle Network with Hydrophobic Channel

JIANG Ming

*Journal of Functional Polymers*, 2019, 32(1): 1-4.

A new type of micelles, suggested and termed as semi-bald micelle by Prof. Ding's group, forms with collapse of the thermosensitive corona upon heating, and further aggregates into a percolated micelle network with hydrophobic channel, resulting in a thermogel composed of some amphiphilic block copolymers in water.

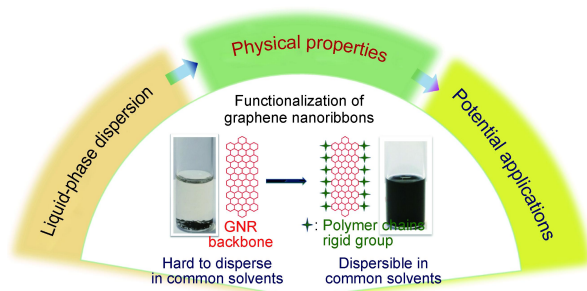


Single Graphene Nanoribbons in Liquid Phase : Chemical Synthesis and Photophysical Properties

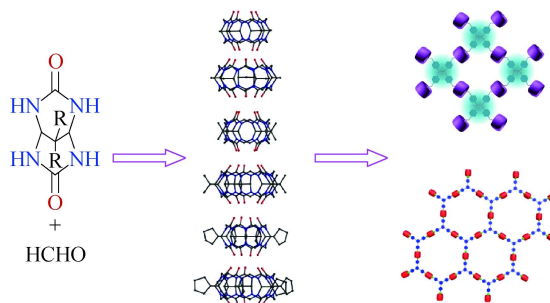
LU Guolin, HUANG Xiaoyu

*Journal of Functional Polymers*, 2019, 32(1): 5-8.

This highlight introduces a study from Prof. Mai's group at Shanghai Jiao Tong University, which focused on the synthesis of structurally defined graphene nanoribbons (GNRs) in liquid phase so as to pave the way for understanding the physical properties of individual GNRs in liquid phase and for exploring their potential applications.



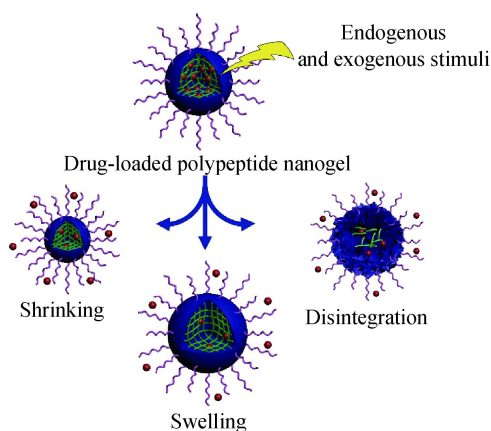
A series of helianthus-like cucurbituril analogues were prepared by the condensation of glycoluril-like propanediureas with formaldehyde, showing important potential applications in the construction of supramolecular polymers.



Special Reviews

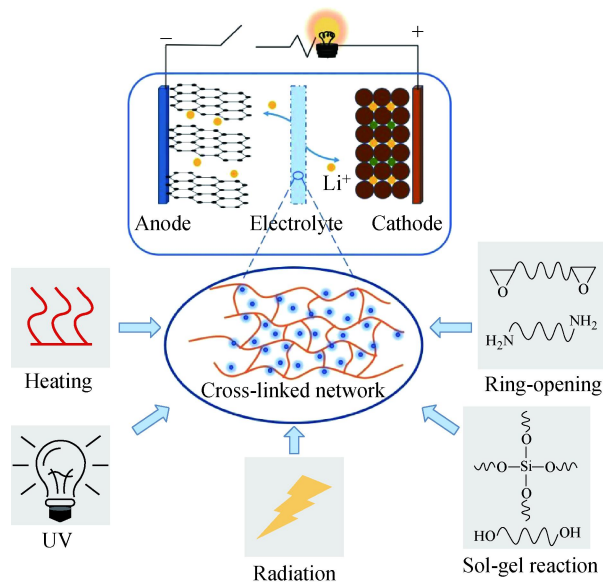
Functional Polypeptide Nanogels

A variety of functional polypeptide nanogels are prepared for controlled drug delivery mediated by the endogenous (e.g., reduction, reactive oxygen species, pH, and enzymes) or exogenous stimuli (e.g., light and temperature) through the appropriate transitions, e.g., shrinking, swelling, or disintegration.



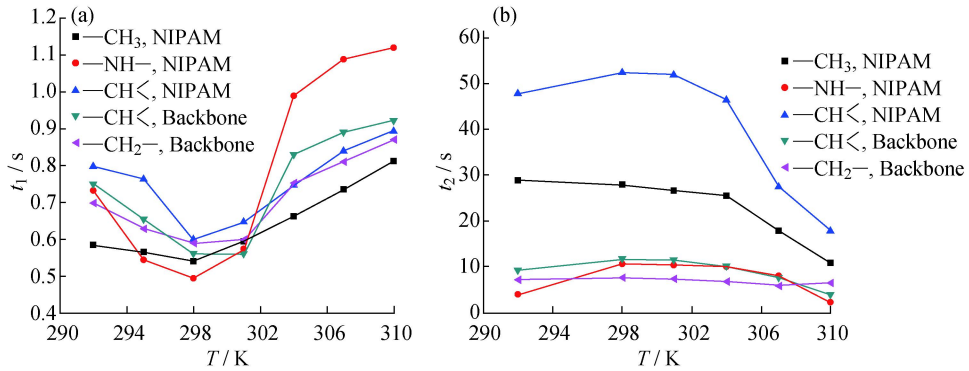
Research Advances on Chemical Crosslinked Gel Polymer Electrolytes for Lithium Ion Batteries

To improve the mechanical properties and dimensional stability of gel polymer electrolytes (GPEs), various initiation methods such as thermal initiation, photoinitiation, radiation initiation, addition of epoxy groups and sol-gel method, have been used to introduce cross-linked structures into the framework of GPEs.



Solid-State NMR Study on the Molecular Motion of Thermal Sensitive SA /P(NIPAM- *co*-AM) Hydrogel

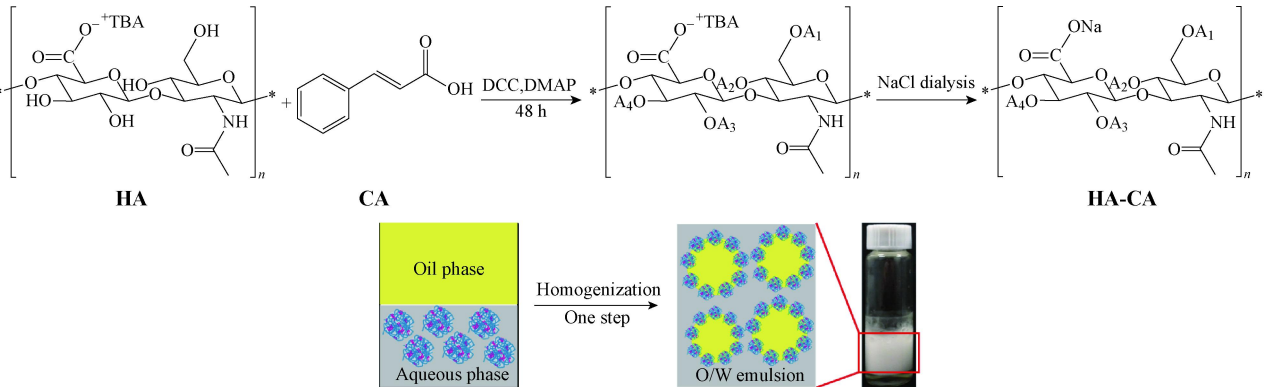
RONG Chenliang, HOU Lifeng, HUANG Hailong, XU Min

*Journal of Functional Polymers*, 2019, 32(1): 45-52.

With the increase of temperature, the mobility of different groups in different frequency do not change synchronizedly, but in sequence. The high frequency motion of main chain is first affected, followed by high frequency motion of the side chain, low frequency motion of the side chain, and finally the low frequency motion of main chain.

## Preparation and Performance of Particulate Emulsifier Self-assembled from Cinnamic Acid Modified Hyaluronic Acid

RAN Haiyan, HONG Hui, ZHU Chao, QIU Ye, WU Ruixue, ZHU Ye, LUO Jing, LIU Xiaoya

*Journal of Functional Polymers*, 2019, 32(1): 53-62.

The carboxyl groups on the cinnamic acid (CA) and the hydroxyl groups on the hyaluronic acid (HA) were bonded together through esterification to form amphiphilic macromolecule HA-CA. Then HA-CA colloidal particles were prepared via self-assembly in the selective solvent. The secondary self-assembly of formed colloidal particles occurs on the oil-water interface, where stable emulsion was formed.

## Three-Dimensional Printed Dual Setting POXC/CPC Bone-Repaired Scaffolds with Adjustable Degradation

SONG Zhiyan, GE Caicai, CHEN Fangping, LIU Changsheng

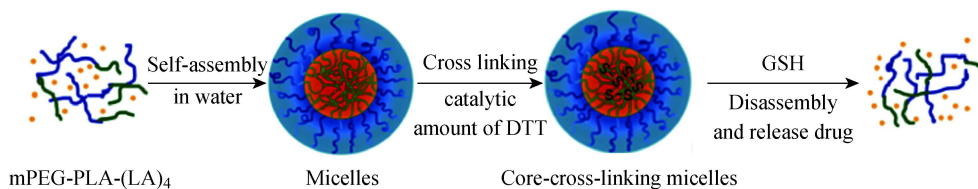
*Journal of Functional Polymers*, 2019, 32(1): 63-70.

A kind composite mixture was composed of calcium phosphate bone cement and a kind of polyester with adjustable degradability. Each of two components can be cured under appropriate conditions. Good mechanical properties can be obtained by the composite material, and 3D printing was used to form porous scaffold.

## Preparation and Properties of Redox-Responsive Paclitaxel Micelles

WANG Lei, GONG Feirong, LIU Feng, ZHANG Weian

*Journal of Functional Polymers*, 2019, 32(1): 71-79.



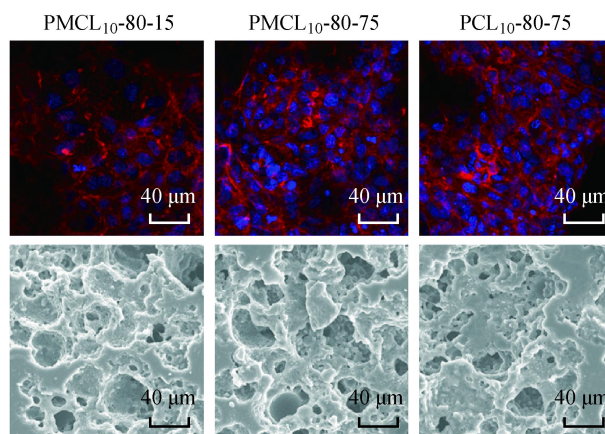
A novel disulfide cross-linked redox-sensitive lipoic acid dendronized methoxy polyethylene glycol-poly(lactide) block copolymer ( $m\text{PEG-PLA}-(\text{LA})_4$ ) was successfully prepared. Compared with  $m\text{PEG-PLA}$  micelles,  $m\text{PEG-PLA}-(\text{LA})_4$  micelles have better stability and redox-responsive. The *in vivo* results reveal that  $m\text{PEG-PLA}-(\text{LA})_4$  micelles reduce the acute toxicity in mice and show improved anti-tumor efficacy compared with  $m\text{PEG-PLA}$  micelles.

## Polyester-Based PolyHIPE Scaffolds with Interconnected Porous Structure for Hepatocyte Culture

ZHOU Miaomiao, ZHANG Mi, ZHOU Yan, XIAO Yan

*Journal of Functional Polymers*, 2019, 32(1): 80-89.

Polyester-based poly (high internal phase emulsion) (PolyHIPE) scaffolds, prepared by high internal phase emulsion, promoted hepatocyte adhesion, proliferation and function express. The higher water temperature in HIPE contributed to the lower stiffness of the scaffolds, which was beneficial for hepatocyte growth.

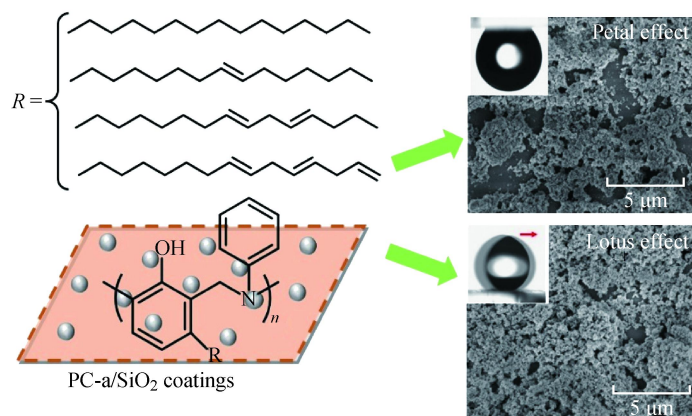


## Preparation and Properties of Superhydrophobic Coatings Based on Cardanol Polybenzoxazine

ZHANG He, LU Xin, YAO Hongjie, ZHOU Changlu, XIN Zhong

*Journal of Functional Polymers*, 2019, 32(1):90-95.

Superhydrophobic coatings combined with cardanol-based polybenzoxazine and silica nanoparticles were produced through spinning coating technique and thermal curing method. Both "lotus effect" and "petal effect" superhydrophobic  $\text{PC-a/SiO}_2$  coatings were developed by incorporating different contents of  $\text{SiO}_2$  nanoparticles. This superhydrophobic coating shows excellent thermal stability and UV resistant property.

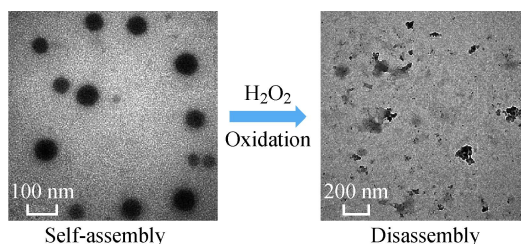


## Synthesis and Properties of Oxidation-Responsive Selenium-Containing Polycaprolactone-*b*-Polyphosphoester Triblock Polymeric Micelles

MA Chuan, WEI Chao, SUN Chuanhao, ZHANG Yan

*Journal of Functional Polymers*, 2019, 32(1): 96-102.

The self-assembled selenium-containing triblock polycaprolactone-*b*-polyphosphoester micelle could disassemble in the presence of oxidation conditions due to the stimuli-responsiveness of selenium.

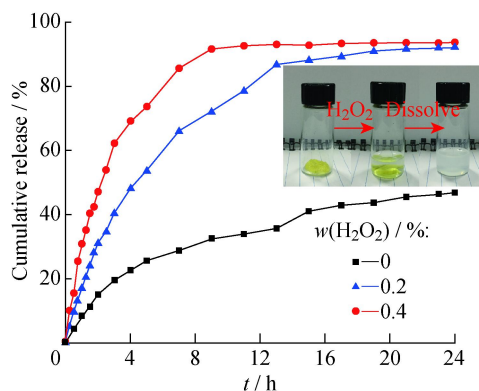


## Synthesis and Drug Release Behavior of Diselenide Dextran Hydrogel

CHENG Penghui, LIU Xiaoyun, ZHUANG Qixin

*Journal of Functional Polymers*, 2019, 32(1): 103-109.

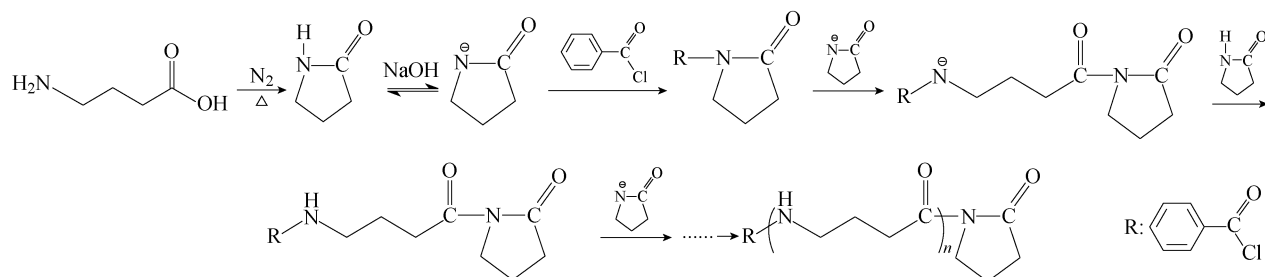
The diselenide dextran hydrogel can respond to oxidation stimulus and shows different drug release behaviors with different mass fractions of hydrogen peroxide solution. The hydrogel is a promising candidate for drug delivery.



## Synthesis and Properties of Bio-based Butyrolactam and Polybutyrolactam

WU De, TANG Liangchen, TANG Songchao, QIAN Jun, WEI Jie, ZHAO Liming

*Journal of Functional Polymers*, 2019, 32(1): 110-116.



Through the successful synthesis of bio-based butyrolactam, the bio-based polybutyrolactam was achieved finally. In theory, the bio-based polybutyrolactam could have similar properties as the petroleum-based polybutyrolactam.