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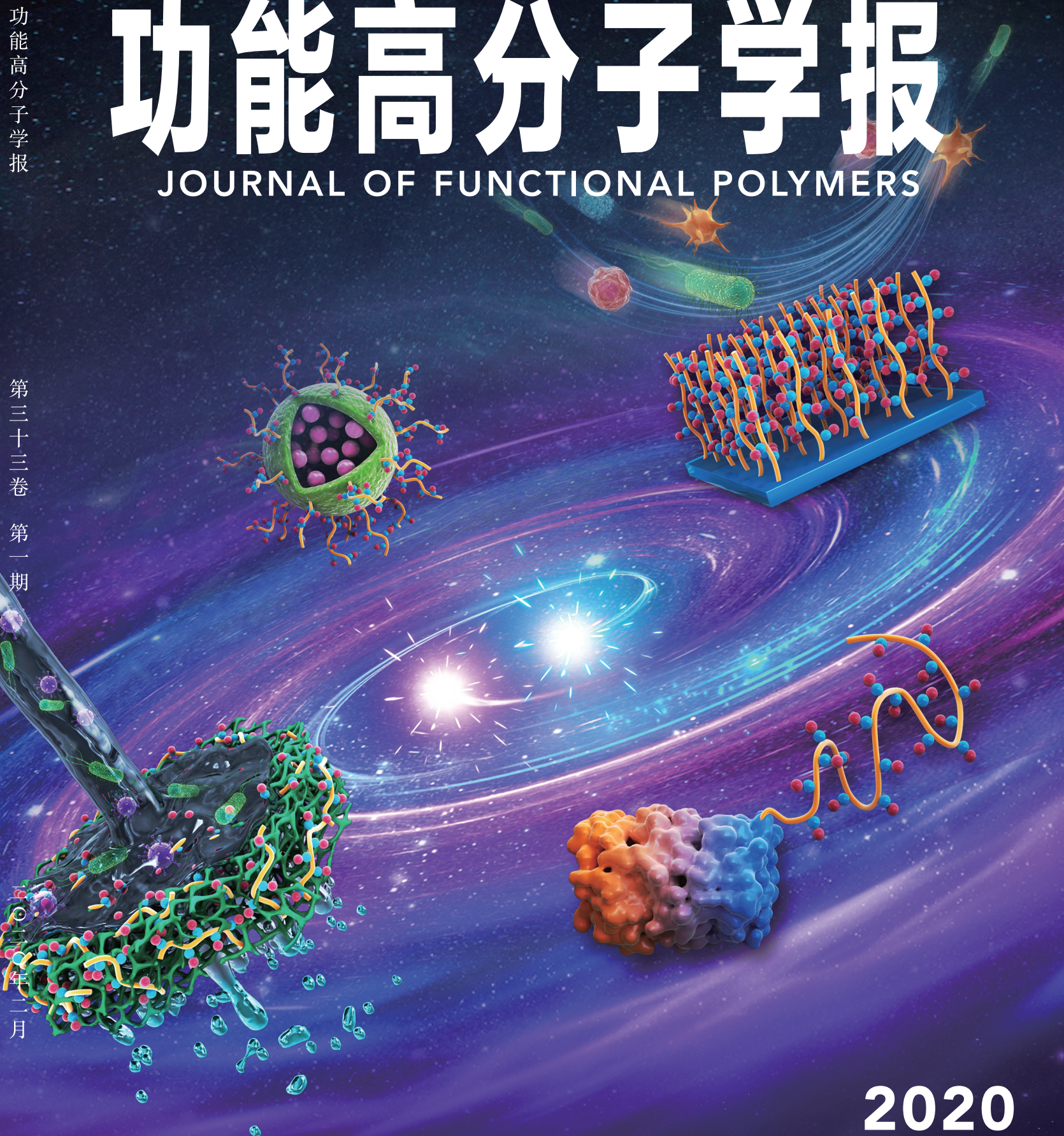
功能高分子学报

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目 次

特约综述

两性离子聚合物的研究进展 闫树鹏, 张 冲, 吕 华 (1)

研究论文

基于超支化聚醚的纳米级超声造影剂 李 捷, 黄 平, 王 琮, 杨少玲, 周永丰 (15)

纳米金和荧光 DNA 的腺苷和钾离子一体化检测

..... 郑 斌, 贺克伍, 程 盛, 董华泽, 余永强, 胡进明 (22)

刀豆球蛋白 A 诱导的葡聚糖纳米凝胶高级自组装 徐 源, 刘灵珊, 王 灏, 窦红静 (30)

钛金属表面骨诱导型可降解壳聚糖涂层的构建及生物活性调控

..... 李海霞, 何宏燕, 董秀琳, 常铃雪, 刘昌胜 (39)

形状记忆取向纤维膜的形状回复力调控

..... 霍 影, 王先流, 易兵成, 沈炎冰, 张彦中 (46)

γ -聚谷氨酸/壳聚糖纳米颗粒的制备及 pH 响应释放性能

..... 任东雪, 陈鹏程, 郑 璞, 徐志南, 卢 松 (54)

乙醇对碳纤维复合材料界面的影响 杨福挺, 杨冲冲, 李英昊, 郑 震, 王新灵 (63)

高分子化紫外吸收剂的合成与抗紫外性能 蔡 毅, 高凤翔, 张亚明, 周庆海, 王献红 (70)

胶原蛋白/纤维素纳米晶体敷料的制备及性能 周姝妤, 许淑琴, 梁李园, 陈敬华 (78)

膦胺类稀土金属钇配合物催化十三烷二酸环乙撑酯与小环内酯共聚合

..... 董婧晗, 杨 珂, 于 辉, 牛 慧, 李 杨 (86)

基于聚醚胺改性的 WPU/MMT 纳米复合乳液

..... 孔子文, 单 宁, 伏 阳, 苏 毅, 周忠武, 东为富, 张胜文 (93)

高强度丝蛋白/聚乙二醇冻凝胶的制备和表征 唱焕良, 邵长优, 孟 蕾, 杨 俊 (98)

《功能高分子学报》第二届青年编辑委员会 (封二)

《功能高分子学报》征稿简则 (封三)

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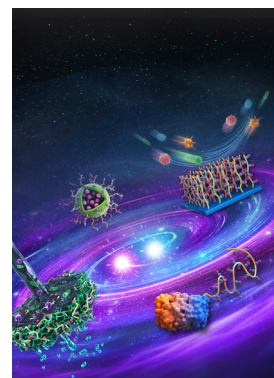
Cover Story

Advances in Zwitterionic Polymers

YAN Shupeng, ZHANG Chong, LYU Hua

Journal of Functional Polymers, 2020, 33(1): 1–14.

Zwitterionic polymers, as a special kind of macromolecules that are overall neutral in charge but contain both cationic and anionic moieties, exhibit an advantageous combination of ionic and nonionic polymers properties such as high hydrophilicity and good biocompatibility. These features make zwitterionic polymers extensively explored in the area of antifouling coatings, protein modification, drug delivery systems, membrane separation, etc.



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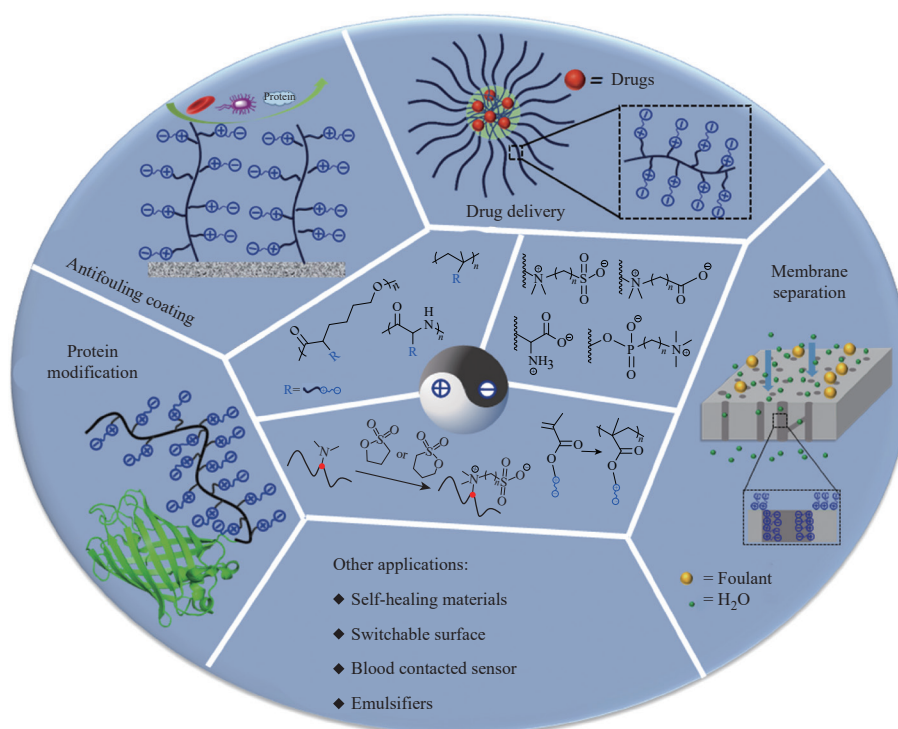
Invited Review

Advances in Zwitterionic Polymers

YAN Shupeng, ZHANG Chong, LYU Hua

Journal of Functional Polymers, 2020, 33(1): 1–14.

The recent advancements of zwitterionic polymers with regard to their structure, synthesis, and promising applications are described in this review. A special focus is placed on the application of zwitterionic polymers in the area of antifouling coatings, protein modification, drug delivery systems, and membrane separation.

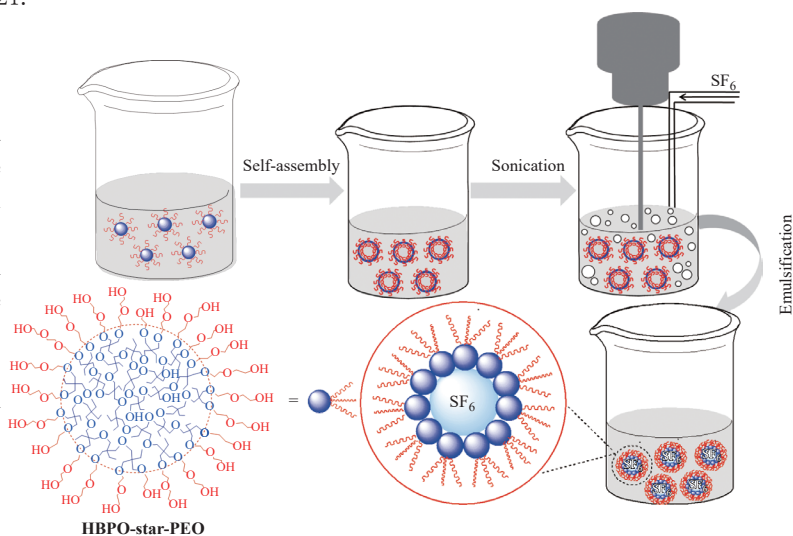


Nano-Scale Ultrasound Contrast Agent Based on Hyperbranched Polyether

LI Jie, HUANG Ping, WANG Cong, YANG Shaoling, ZHOU Yongfeng

Journal of Functional Polymers, 2020, 33(1): 15–21.

Amphiphilic hyperbranched polymer HBPO-star-PEO usually self-assemble into vesicles in water. However, when applying ultrasonication force and injecting SF₆ gas into the water simultaneously, the amphiphilic macromolecule HBPO-star-PEO will diffuse into the interface of the gas and water to reduce the interfacial tension and eventually form the microbubbles or nanobubbles with SF₆ as the inner gas, HBPO-star-PEO as the external shell. In this context, the longer arm-length HBPO-star-PEO is easy to form nanobubbles in water and can be used as nano-scale UCA.

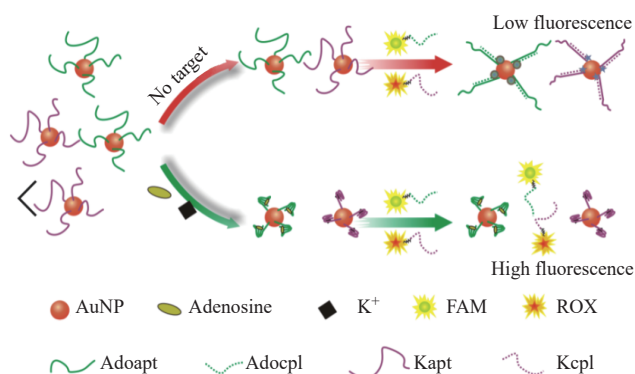


Multiple Analytes Detection Based on Gold Nanoparticles and Fluorescent Oligonucleotides in One-Pot

ZHENG Bin, HE Kewu, CHENG Sheng, DONG Huaze, YU Yongqiang, HU Jinming

Journal of Functional Polymers, 2020, 33(1): 22–29.

The formation of secondary structure induced by target binding onto aptamer excludes fluorescent oligonucleotide (carboxyfluorescein (FAM) modified DNA complementary for adenosine and rhodamine (ROX) modified DNA complementary for potassium ions) from gold nanoparticles (quencher), presenting a signal-on sensor.

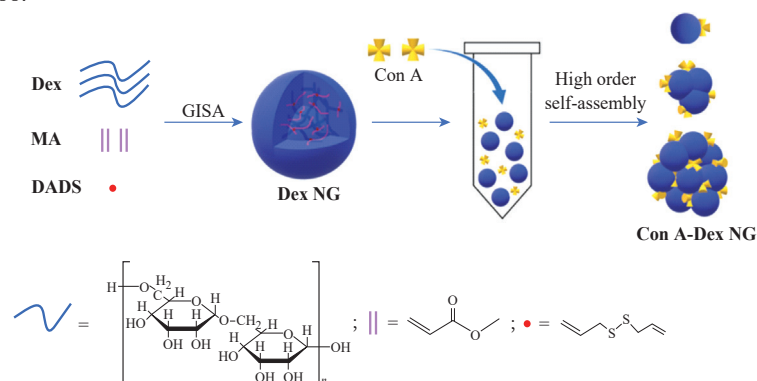


High Order Self-assembly of Dextran Nanogels Induced by Con A

XU Yuan, LIU Lingshan, WANG Hao, DOU Hongjing

Journal of Functional Polymers, 2020, 33(1): 30–38.

A high order self-assembly of dextran nanogels and concanavalin A (Con A) has been achieved on the basis of the specific recognition between Con A and the glucose unit in the dextran. The self-assembled structures show efficient antitumor effect on A549 cells.

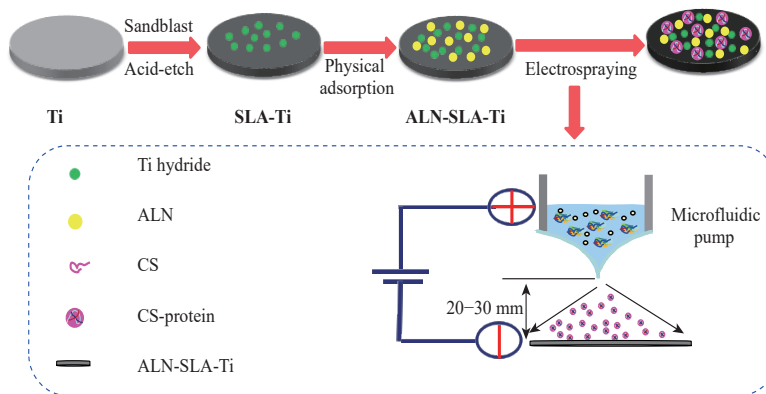


Construction of Osteoinductive and Biodegradable Chitosan-Coating on Titanium Surface and Regulation of Biological Activities

LI Haixia, HE Hongyan, DONG Xiulin, CHANG Lingxue, LIU Changsheng

Journal of Functional Polymers, 2020, 33(1) : 39–45.

The chitosan microsphere coating was constructed on the surface of ALN-SLA-Ti after 5 min of electrostatic spraying. It retained the porous structure and improved the hydrophilicity. The coating significantly achieved the sustained release of protein and slowed down the burst release. The immobilized protein was more conducive to cell adhesion and proliferation, and promote osteogenic differentiation of cells.

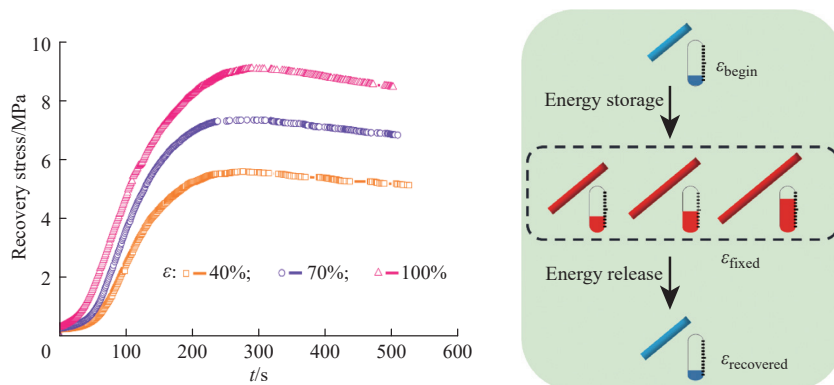


Regulating the Shape Recovery Stress of Aligned Fibrous Mats with Shape Memory Capability

HUO Ying, WANG Xianliu, YI Bingcheng, SHEN Yanbing, ZHANG Yanzhong

Journal of Functional Polymers, 2020, 33(1) : 46–53.

Shape recovery stress of the highly-aligned PLLA/PHBV fibers could be modulated by varying the prior-programmed tensile strains, which essentially indicates a relationship between energy storage and release during the process of programmed shape fixation and recovery.

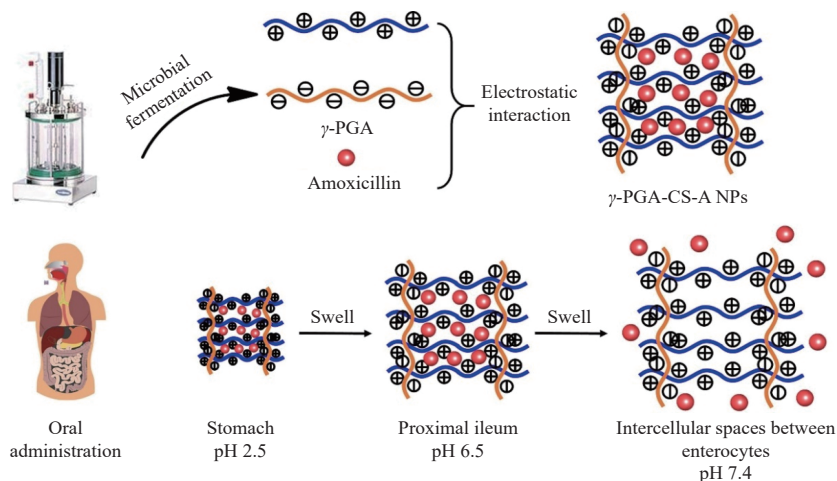


Preparation of Poly-γ-Glutamic Acid/Chitosan Nanoparticles and pH Responsive Release Properties

REN Dongxue, CHEN Pengcheng, ZHENG Pu, XU Zhinan, LU Song

Journal of Functional Polymers, 2020, 33(7) : 54–62.

Nanoparticles were prepared by electrostatic self-assembly between carboxyl group of γ -PGA and amino group of CS, which were used to load the amoxicillin. The drug-loaded nanoparticles showed good biocompatibility and were stable under gastric acid conditions (pH 2.5). The drug-loaded nanoparticles swelled in the intestinal environment (pH 6.5), and the loaded drugs were released in the intestinal cell gap (pH 7.4).

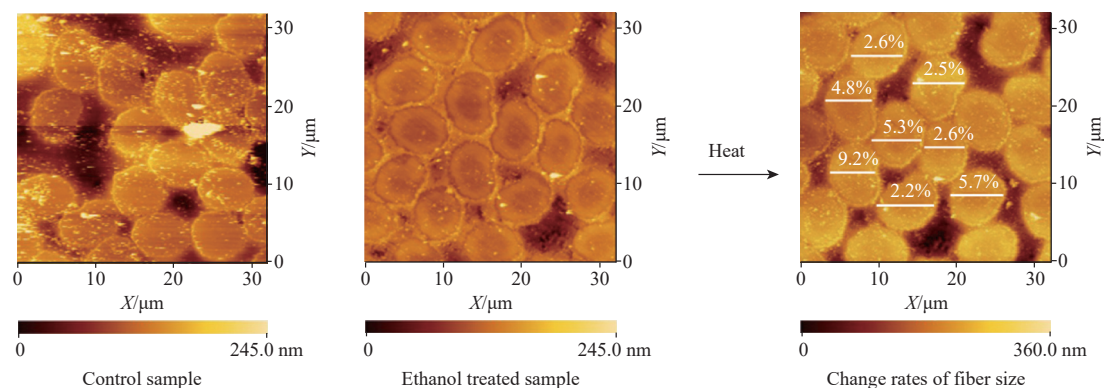


Effect of Ethanol on the Interface of Carbon Fiber Reinforced Polymers Composites

YANG Futing, YANG Chongchong, LI Yinghao, ZHENG Zhen, WANG Xinling

Journal of Functional Polymers, 2020, 33(1) : 63–69.

A method for *in situ* characterization of morphological changes of CFRPs interface using ECSPM was proposed. Ethanol treatment led to the expansion of interfacial resin, which can result in significant increase in fiber size in thermal environment.

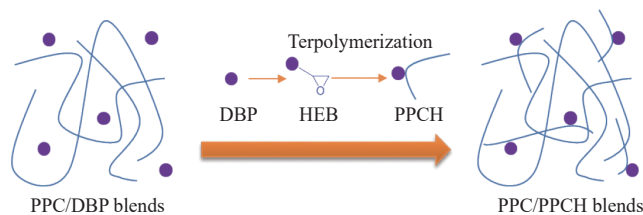


Synthesis and Ultraviolet Resistance of Macromolecule Ultraviolet Absorbents

CAI Yi, GAO Fengxiang, ZHANG Yaming, ZHOU Qinghai, WANG Xianhong

Journal of Functional Polymers, 2020, 33(1) : 70–77.

Polymeric UV-absorbent PPCH can solve the problem of external migration of traditional small molecular ultraviolet absorbent effectively with good compatibility blend with PPC.

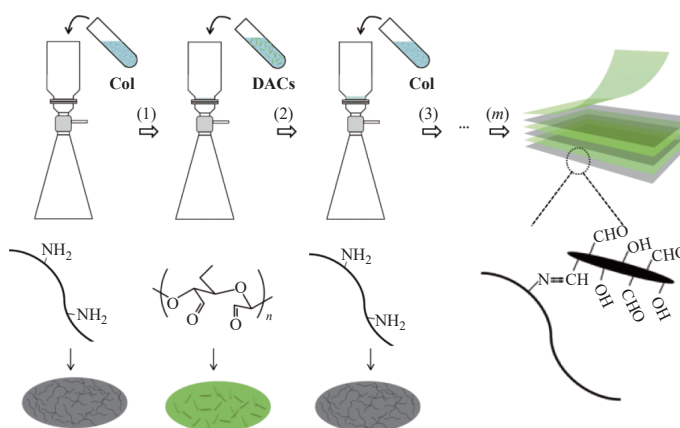


Preparation and Properties of Collagen/Cellulose Nanocrystals Dressing

ZHOU Shuyu, XU Shuqin, LIANG Liyuan, CHEN Jinghua

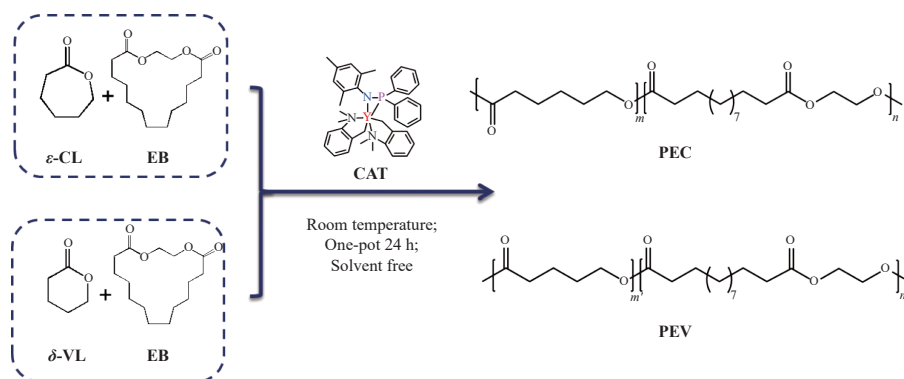
Journal of Functional Polymers, 2020, 33(1) : 78–85

Multilayer films were prepared by alternately filtering DACs solutions and collagen solutions. The aldehyde groups on the surface of DACs reacted with the amino groups of collagen, resulting in chemical cross-linking networks between the adjacent layers.



Copolymerization of Ethylene Brassylate with Small Lactones Using a Mono(phosphinoamide) Rare-Earth Yttrium Complex
 DONG Jinghan, YANG Ke, YU Hui, NIU Hui, LI Yang
Journal of Functional Polymers, 2020, 33 (1) : 86–92.

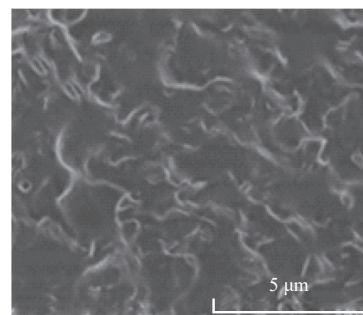
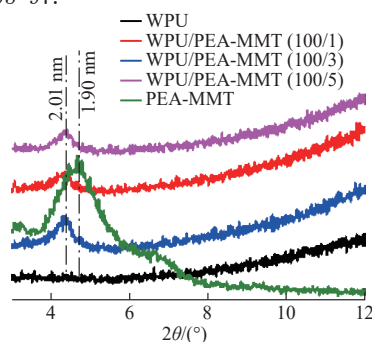
Upon using a mono(phosphinoamide) rare-earth yttrium complex $(2,4,6\text{-Me}_3\text{C}_6\text{H}_2\text{NPPh}_2)\text{Y}(\text{CH}_2\text{C}_6\text{H}_4\text{NMe}_2\text{-}o)_2$ catalyst, copolymers based on ethylene brassylate (EB) and small lactones including δ -valerolactone (δ -VL) and ϵ -caprolactone (ϵ -CL) were synthesized through a one-pot solvent-free ring-opening polymerization approach which was performed at mild conditions (for 24 h at room temperature).



WPU/MMT Nanocomposite Dispersion Based on Polyetheramine Modification

KONG Ziwen, SHAN Ning, FU Yang, SU Yi, ZHOU Zhongwu, DONG Weifu, ZHANG Shengwen
Journal of Functional Polymers, 2020, 33 (1) : 93–97.

Polyetheramine modified montmorillonite (PEA-MMT) is homogeneously dispersed in the WPU film and shows slight lamellar orientation. The increase in the PEA-MMT interlayer space resulted from the WPU segments are inserted in the PEA-MMT layers.



Preparation of High-Strength Silk Fibroin/Polyethylene Glycol Cryogel

CHANG Huanliang, SHAO Changyou, MENG Lei, YANG Jun
Journal of Functional Polymers, 2020, 33 (1) : 98–104.

SF/PEG cryogels are produced by freeze-thawing treatment show excellent elasticity and toughness, which can withstand large strain (80%) and stress (3.5 MPa) without permanent deformation and fracture as demonstrated by compressive tests. The obtained mechanical properties are superior to those SF/PEG hydrogels that are prepared by heating. Beside, SF/PEG cryogels show good self-recovery property.

