Chinese Journal of Polymer Science

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doi: 10.1007/s10118-025-3480-x

Cover Image: adapted from Zhao-Yang Chen, Ke-Feng Ren, Xiao-Liang Shi and Jian Ji (Article pages 13–20).

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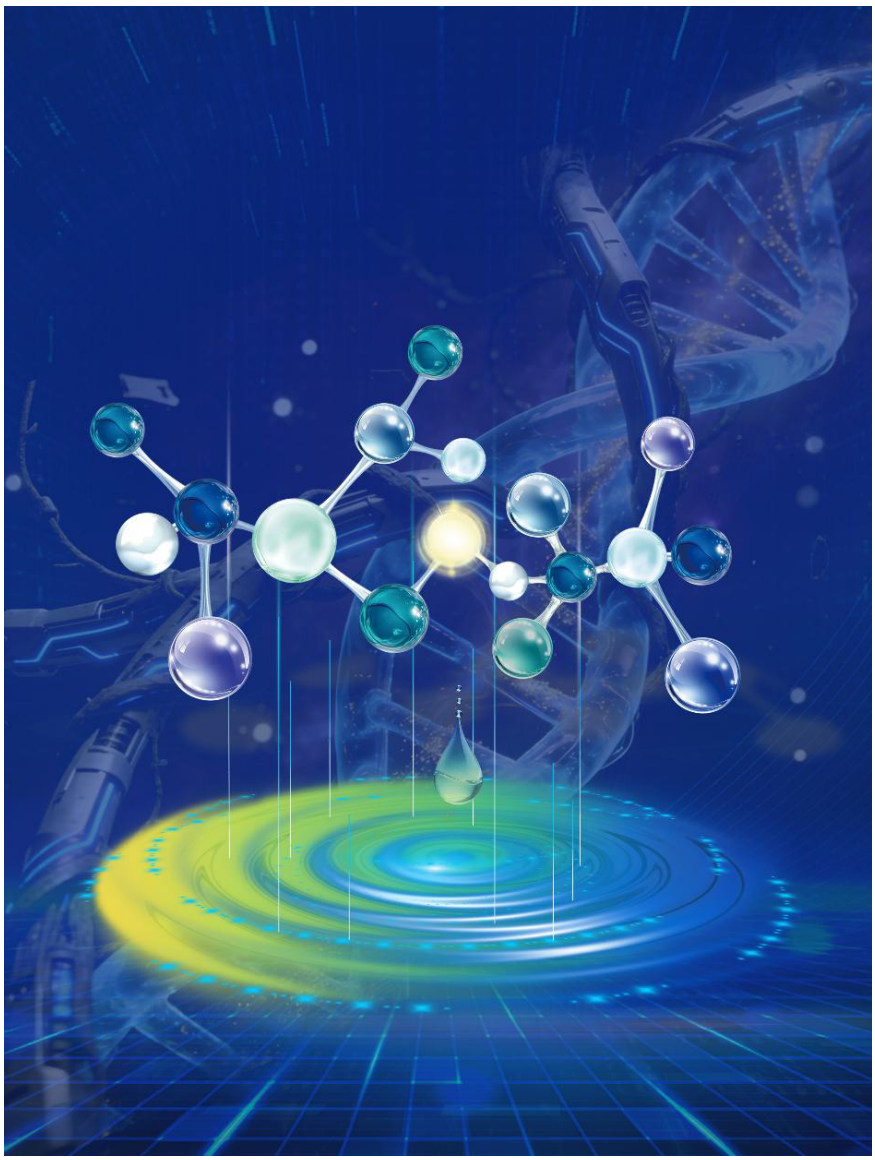
Cover Image

Visual pH-responsive Material Based on Bromothymol Blue-immobilized Carboxymethyl Cellulose

Shan-Shan Yu, Zhao-Yang Chen, Xiang-Mei Sun, Hai-Tao Pan, Zi-Hao Yang, Ke-Feng Ren, Xiao-Liang Shi, and Jian Ji

Zhejiang University; Shaoxing Maternity and Child Health Care Hospital; National Clinical Research Center for Child Health; the Second Affiliated Hospital Zhejiang University School of Medicine

This work illustrates a reusable smart material where a pH-indicator is covalently grafted onto a biopolymer. The firm chemical conjugation enables rapid, naked-eye colorimetric response to pH changes, demonstrating its potential for non-invasive monitoring such as intelligent food packaging and wound management.



Chinese J. Polym. Sci. 2026, 44(1), 13–20 *https://doi.org/10.1007/s10118-025-3477-5*

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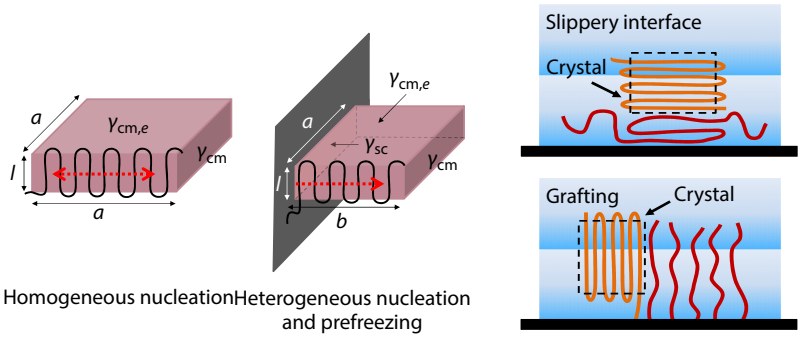
Feature Articles

Nucleation of Polymers in Nanopores and Nanocomposites with Nanoparticles/Nanosheets

Ming Wang, Ye Yao, Hui Zhao, Wei-Long Ju, Yun-Lan Su, Du-Jin Wang, and Guo-Ming Liu

Institute of Chemistry, Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China; Politecnico di Torino-Alessandria Campus, Italy

This feature article reviews recent advances in polymer nucleation under confined and interface-dominated conditions, focusing on anodic aluminum oxide (AAO) templates and nanocomposites containing nanoparticles or nanosheets. The interplay of finite-size and interfacial effects gives rise to distinctive phenomena, including homogeneous nucleation, surface nucleation, prefreezing, and supernucleation.



Chinese J. Polym. Sci. 2026, 44(1), 1–12 *https://doi.org/10.1007/s10118-025-3508-2*

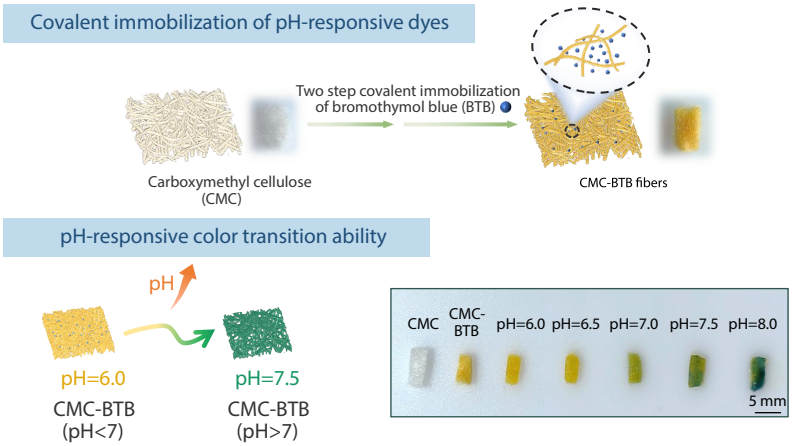
Research Articles

Visual pH-responsive Material Based on Bromothymol Blue-immobilized Carboxymethyl Cellulose

Shan-Shan Yu, Zhao-Yang Chen, Xiang-Mei Sun, Hai-Tao Pan, Zi-Hao Yang, Ke-Feng Ren, Xiao-Liang Shi, and Jian Ji

Zhejiang University; Shaoxing Maternity and Child Health Care Hospital; National Clinical Research Center for Child Health; the Second Affiliated Hospital Zhejiang University School of Medicine

This work demonstrates the covalent immobilization of pH-responsive dyes onto solid substrates. The resulting material exhibits a clear and reversible pH-responsive color transition ability. This stable and reusable colorimetric system holds promise for applications in sensors and visual pH monitoring, enabling simple and effective detection.



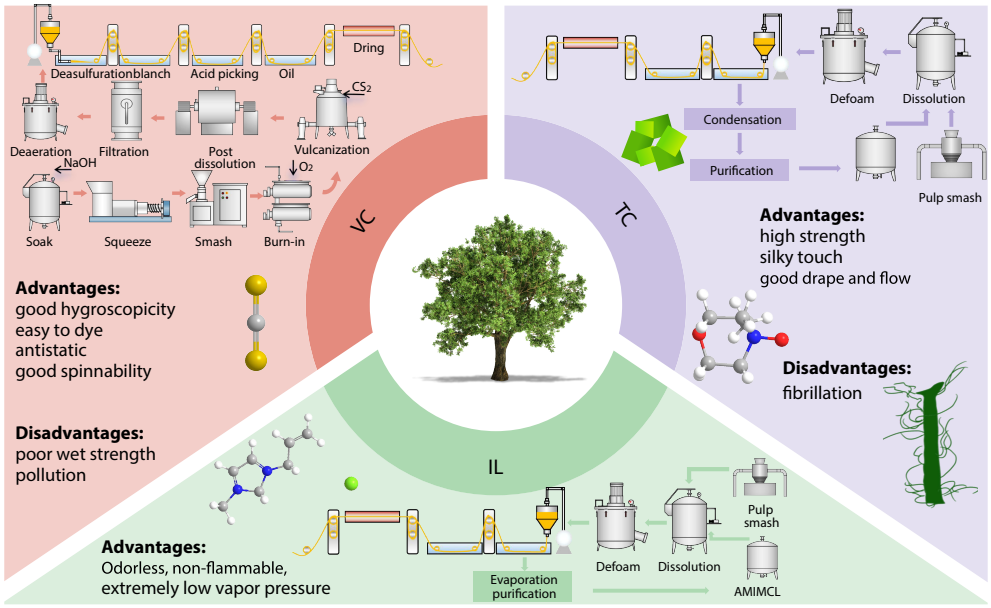
Chinese J. Polym. Sci. 2026, 44(1), 13–20 *https://doi.org/10.1007/s10118-025-3477-5*

Ionic Liquid-regenerated Cellulose Fiber: A Promising Next Generation Regenerated Cellulose Fiber

Xin-Yu Wang, Kun-Kun Zhu, Min Zhang, Yong-Xin Wei, Jing-Jing Yuan, Jin-Ming Zhang, Jin-Feng Wang, and Jun Zhang

Wuhan Textile University; Institute of Chemistry, Chinese Academy of Sciences (CAS)

Ionic liquid (IL)-made regenerated cellulose fibers show smooth surface, circular cross-section, highest tensile strength, moderate dyeing/fibrillation, good spinning/weaving, guiding their commercial use.



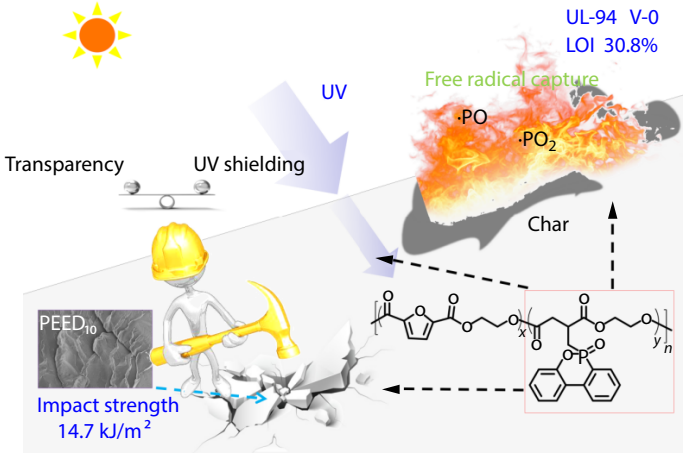
Chinese J. Polym. Sci. 2026, 44(1), 21–29 *https://doi.org/10.1007/s10118-025-3465-9*

An Inherently Flame-retardant Bio-based Poly(ethylene 2,5-furandicarboxylate) Copolyester with High Impact Toughness and UV Shielding

Qi Jiang, Jia-Yi Li, Han Hu, Jin-Hao Sun, Wei-Hong Cao, Lin-Yi Hu, Dong-Qing Wei, Jing-Gang Wang, and Jin Zhu

Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences; University of Chinese Academy of Sciences; Shanghai Jiao Tong University; Qihe Laboratory; Hangzhou Medical College

In this study, a bio-based poly(ethylene 2,5-furandicar-boxylate) (PEF) copolymer was illustrated, integrating intrinsic flame retardancy (UL-94 V-0), exceptional impact toughness (14.7 kJ/m^2), and UV shielding *via* phosphorus-containing segments, overcoming traditional flame retardant trade-offs.



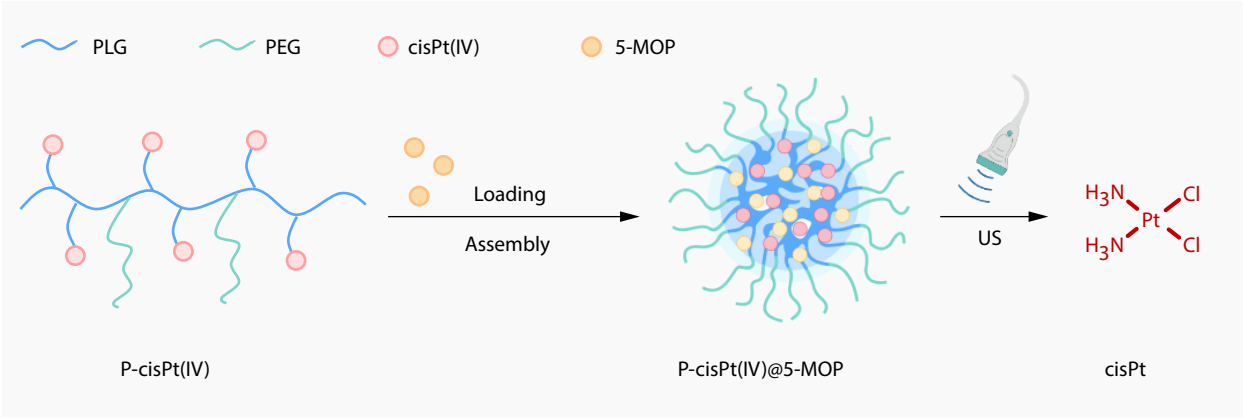
Chinese J. Polym. Sci. 2026, 44(1), 30–43 *https://doi.org/10.1007/s10118-025-3478-4*

Ultrasound-induced Activation of Tetravalent Platinum Polyglutamate Nanoprodrug Accelerated by Coumarin Derivatives

Chao-Ying Kong, Chu-Wen Luo, Ya-Jun Xu, Na Shen, and Zhao-Hui Tang

Changchun Institute of Applied Chemistry, Chinese Academy of Sciences; University of Science and Technology of China

Ultrasound (US)-triggered coumarin derivatives generate superoxide anion radicals ($\bullet O_2^-$), reducing Pt(IV) prodrugs to cytotoxic Pt(II) drugs. A nanoprodrug (P-cisPt(IV)@5-MOP) co-delivered both agents, thus enabling dual-drug chemotherapy. It achieves 90.9% tumor inhibition *in vivo* with a 40% cure rate and low systemic toxicity *via* controllable activation.



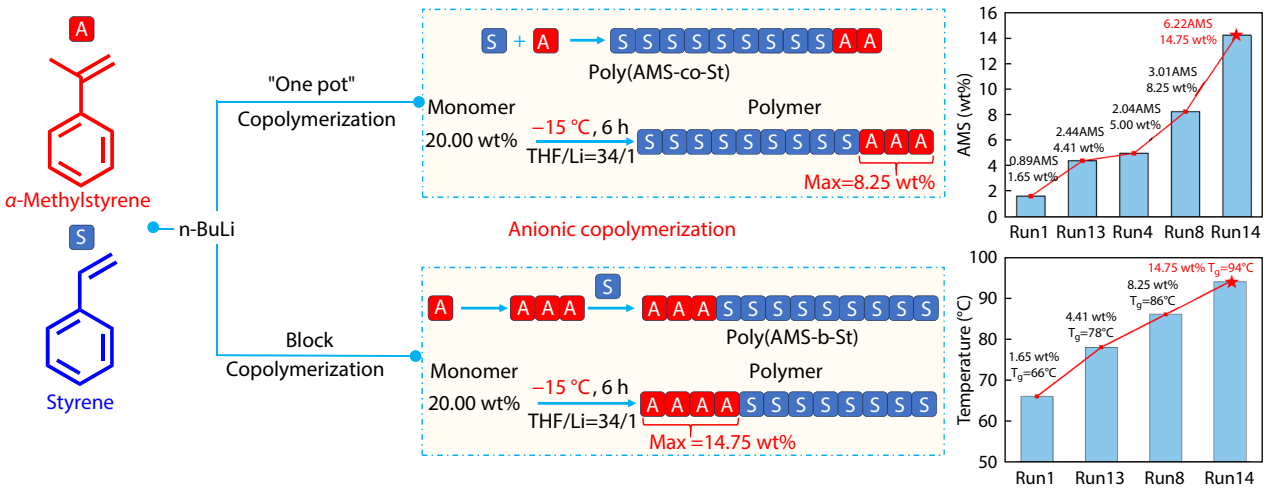
Chinese J. Polym. Sci. 2026, 44(1), 44–56 *https://doi.org/10.1007/s10118-025-3469-5*

Anionic Copolymerization of *α*-Methylstyrene (AMS) and Styrene (St) under the Mild Temperature

Yun-Han Wang, Rui-Xue Zhang, Hai-Tao Leng, Jia-Xing Xu, Xu-Wen Li, Yan-Shai Wang, Hong-Wei Ma, Yang Li, and Li Han

Dalian University of Technology

The anionic copolymerization of *α*-methylstyrene (AMS) and styrene (St) was investigated under mild conditions (−25 °C to 25 °C). Using a stepwise feeding strategy to suppress depolymerization enabled efficient AMS incorporation, resulting in a single, composition-dependent T_g that enhanced the heat resistance of polystyrene (PS).



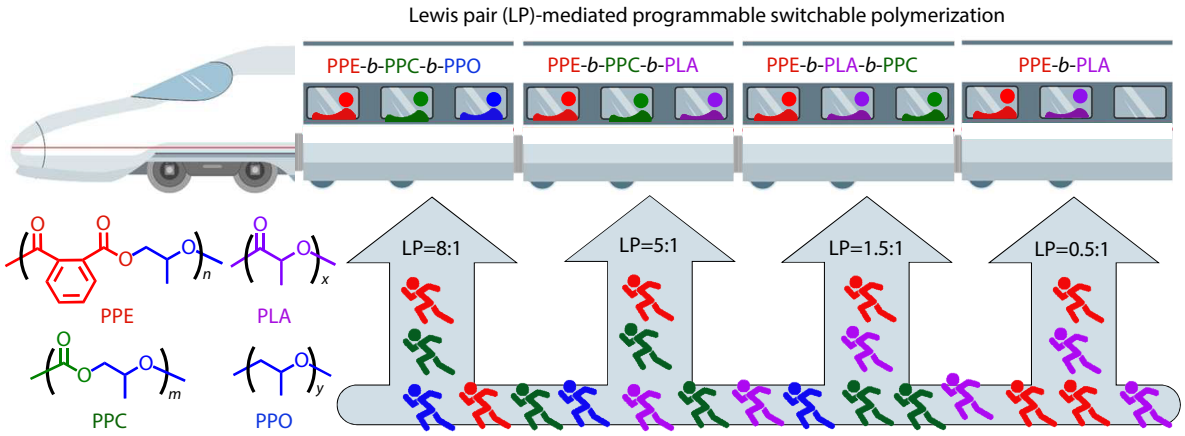
Chinese J. Polym. Sci. 2026, 44(1), 57–67 *https://doi.org/10.1007/s10118-025-3468-6*

The Magic of Organocatalytic Synergism in Switchable Polymerization: One-pot Synthesis of Block Copolymers with Programmable Sequences and Compositions

Shuai-Shuai Zhu, Mao-Ji Zhao, Ying-Jie Yuan, and Yong Wang

Huazhong University of Science and Technology

Switchable polymerization constructs block copolymers directly from monomer mixtures, yet is limited to switch between two predetermined polymerizations and deliver products with fixed sequences. Here, a programmable switchable polymerization was demonstrated by modulating the ratio of triethylborane/1,8-diazabicyclo[5.4.0]undec-7-ene (Et_3B/DBU) to synthesize four different block copolymers from same monomer mixtures.



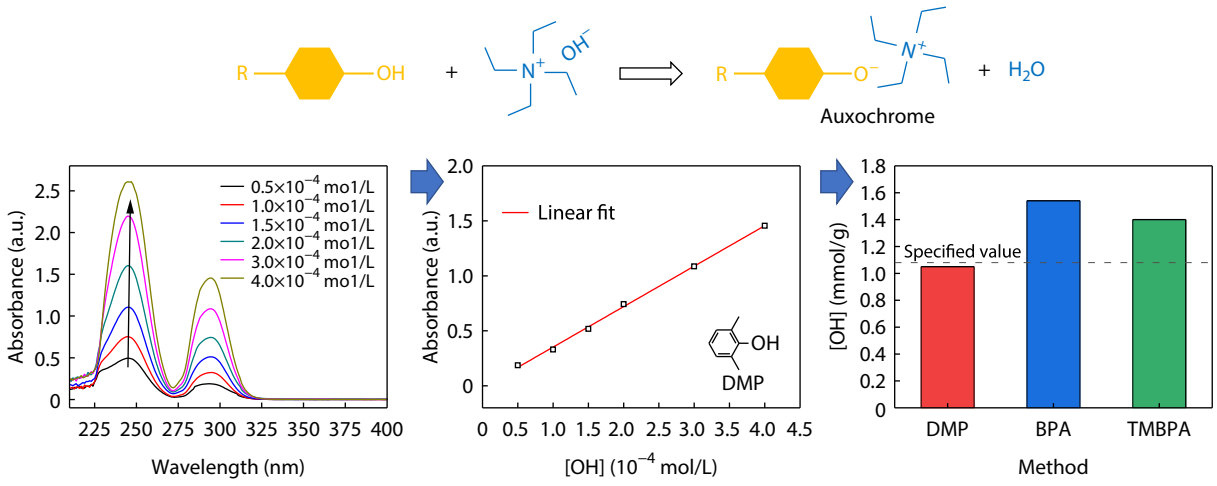
Chinese J. Polym. Sci. 2026, 44(1), 68–78 *https://doi.org/10.1007/s10118-025-3476-6*

Determination of Phenolic Hydroxyl Content in Poly(phenylene oxide) by Differential Ultraviolet Spectrophotometry

Qin-Yu Yan, Shun-Gang Song, Bu-Jie Zhou, Jing Hu, Lian-Fang Feng, Xue-Ping Gu, and Cai-Liang Zhang

Zhejiang University; Institute of Zhejiang University-Quzhou; Hangzhou Polyful Advanced Material Co., Ltd.

This study presents a novel method for quantifying the phenolic hydroxyl content in poly(phenylene oxide) using differential UV absorption spectroscopy. The approach exploits the substantial increase in absorbance at 300 nm in alkaline solutions, providing a precise and straightforward technique with distinct advantages over conventional methods.



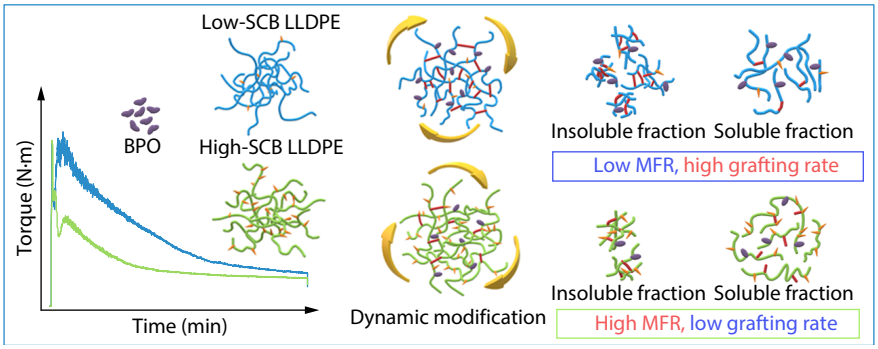
Chinese J. Polym. Sci. 2026, 44(1), 79–86 *https://doi.org/10.1007/s10118-025-3463-y*

Processability and Structure of Dynamically Modified Linear Low-density Polyethylene with Different Branching Contents Using a High Peroxide Content

Jun-Jin Duan, Yan-Qin Huang, Fu-Qing Wei, Yan Gao, Fu-Shan Wang, and Jia-Chun Feng

Fudan University; Petrochemical Research Institute of PetroChina; Lanzhou Petrochemical Corporation of PetroChina

Processability and structure of dynamically modified four linear low-density polyethylenes (LLDPEs) with different branch contents using peroxide were investigated. It was found that, all samples were processable, and higher short-chain branch content led to better flowability, less cross-linked fractions, and lower grafting ratio of peroxide radicals onto the chains.



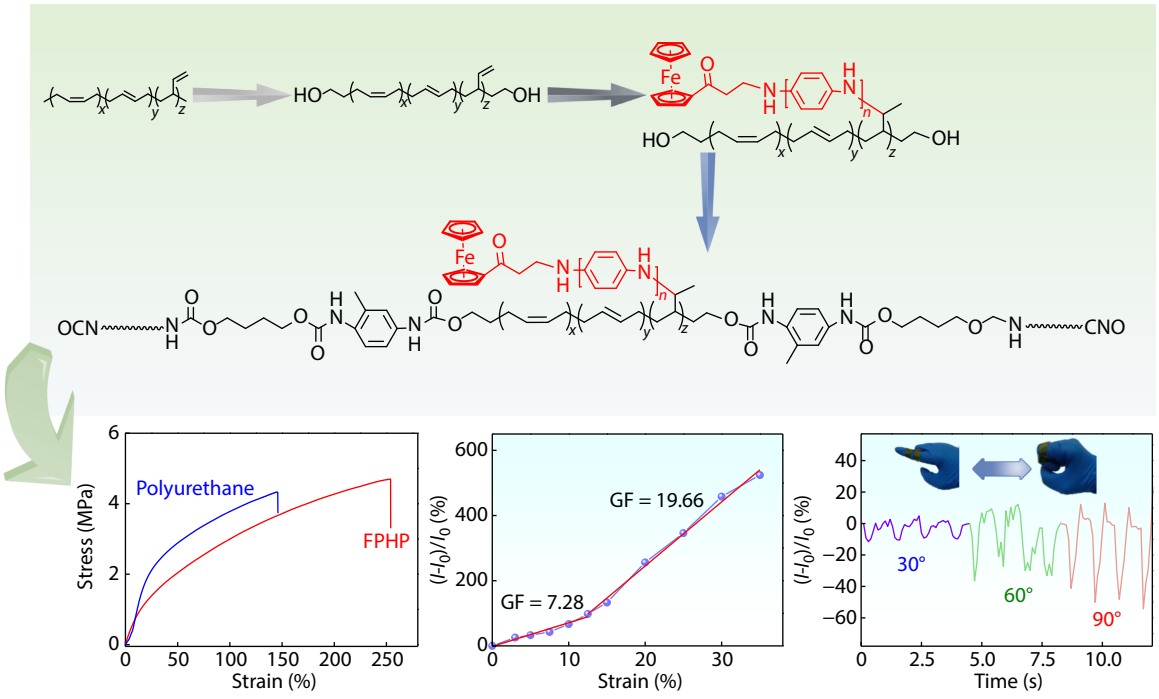
Chinese J. Polym. Sci. 2026, 44(1), 87–99 *https://doi.org/10.1007/s10118-025-3466-8*

Chemically Engineered Hydroxyl-terminated Polybutadiene Yields Stable and High-strain Intrinsically Conductive Polyurethane Piezoresistive Sensors

Li Zhou, Guo-Xuan Ma, Wen-Xue Tian, Wen-Cong Sun, Shu-Miao Li, Xiao-Ru Wang, Wen-Chao Ji, Yin-Yong Sun, and Chun-Xiang Li

Harbin Institute of Technology; Shaanxi Electric Appliance Institute

This study prepared an intrinsically conductive polyurethane sensor (FPHP) by grafting acetylferrocene-polyaniline groups onto HTPB. The sensor exhibits a high strain capacity of 254%, a gauge factor (GF) of 19.66, and a large range of strain sensing capabilities. FPHP enables human motion monitoring *via* a stable strain-current response.



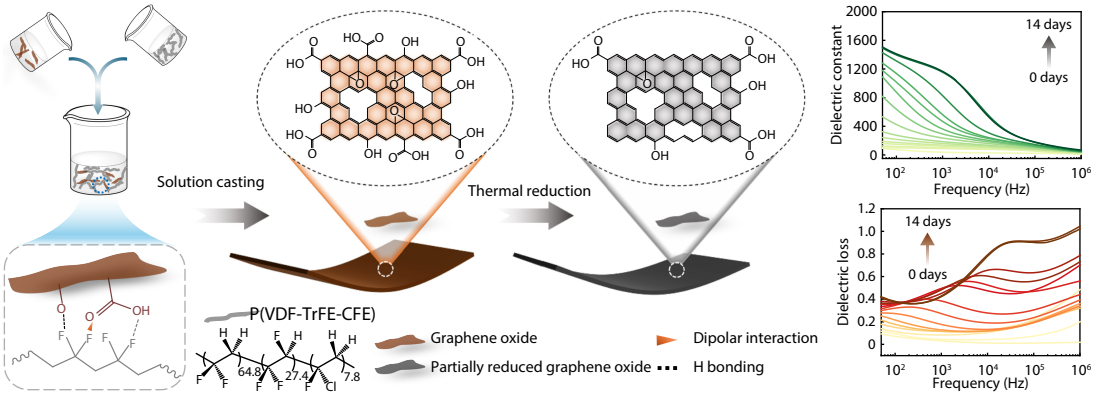
Chinese J. Polym. Sci. 2026, 44(1), 100–115 *https://doi.org/10.1007/s10118-025-3467-7*

Tailoring Dielectric Properties of Polymer Matrix Composites for High-performance Flexible Sensors

Jun Li, Kit-Ming Ma, Li-Sha Zhang, and Xiao-Ming Tao

Wuyi University; The Hong Kong Polytechnic University

A flexible dielectric (ε_r=1415, tanδ=0.380, 100 Hz) is achieved through *in situ* controllable reduction of graphene oxide (GO) in a poly(vinylidene fluoride-trifluoroethylene-chlorofluoroethylene) (P(VDF-TrFE-CFE)) matrix, arising from optimized electron conjugation, controlled charge migration, and uniform filler dispersion *via* micro-interactions.



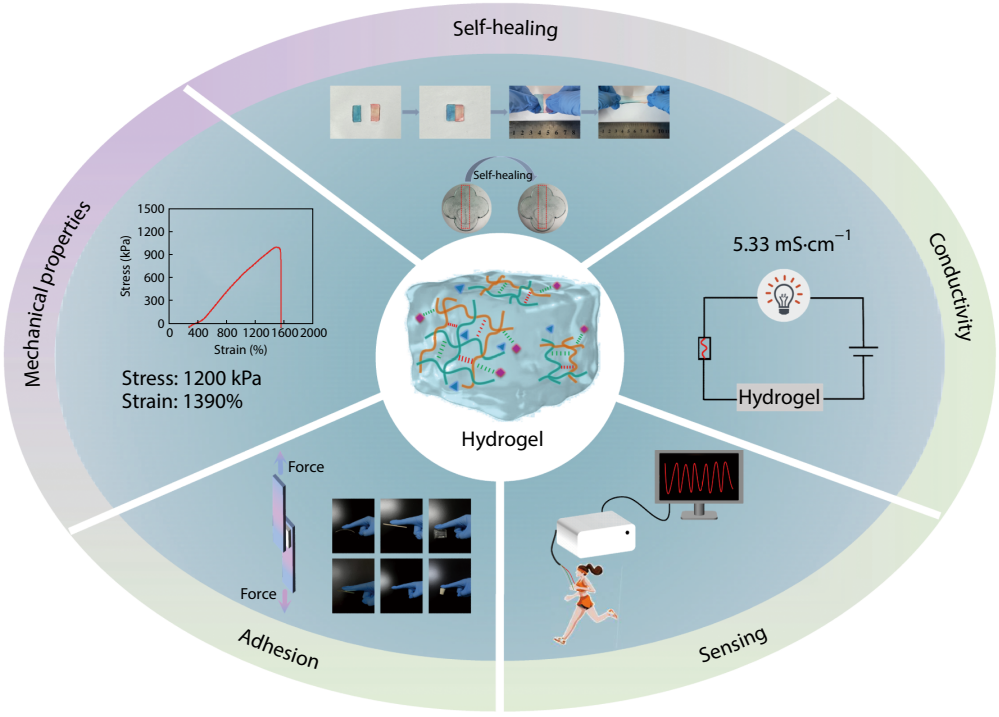
Chinese J. Polym. Sci. 2026, 44(1), 116–126 *https://doi.org/10.1007/s10118-025-3470-z*

Highly Conductive and High-tensile Methacrylated Hyaluronic Acid Hydrogels for Strain Sensing Applications

Meng Zhang and Xu-Dong Yu

Hebei University of Science and Technology

A novel hydrogel sensor by copolymerizing modified hyaluronic acid, olefin monomers, and acrylic acid. The hydrogel exhibits excellent mechanical properties (stress 1200 kPa, strain 1390%), high electrical conductivity (5.33 mS/cm), good sensitivity (GF=2.55) and efficient self-healing properties.



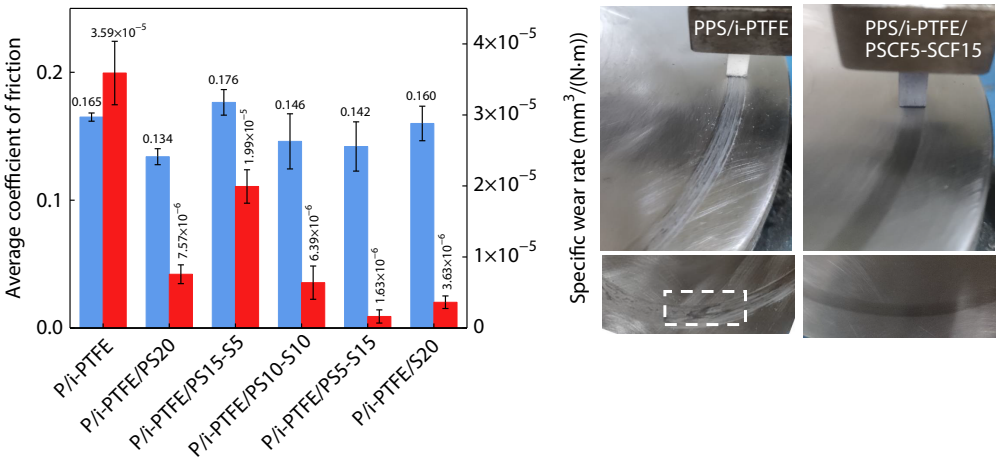
Chinese J. Polym. Sci. 2026, 44(1), 127–139 *https://doi.org/10.1007/s10118-025-3482-8*

Fabrication of Mechanically Robust Self-lubricating Polyphenylene Sulfide Composites for High PV (Pressure × Velocity) Applications

Ji-Xiang Li, Mei Liang, Xiao-Wen Zhao, Sheng-Tai Zhou, and Hua-Wei Zou

Sichuan University

Multi-scale carbon fibers (CFs) can give full play to their respective advantages under certain ratios, thus achieving a significant improvement in the comprehensive performance of polyphenylene sulfide/irradiation treated polytetrafluoroethylene (PPS/i-PTFE). Tribological tests at high PV (pressure × velocity) verified the viability of the composite in a demanding service environment.



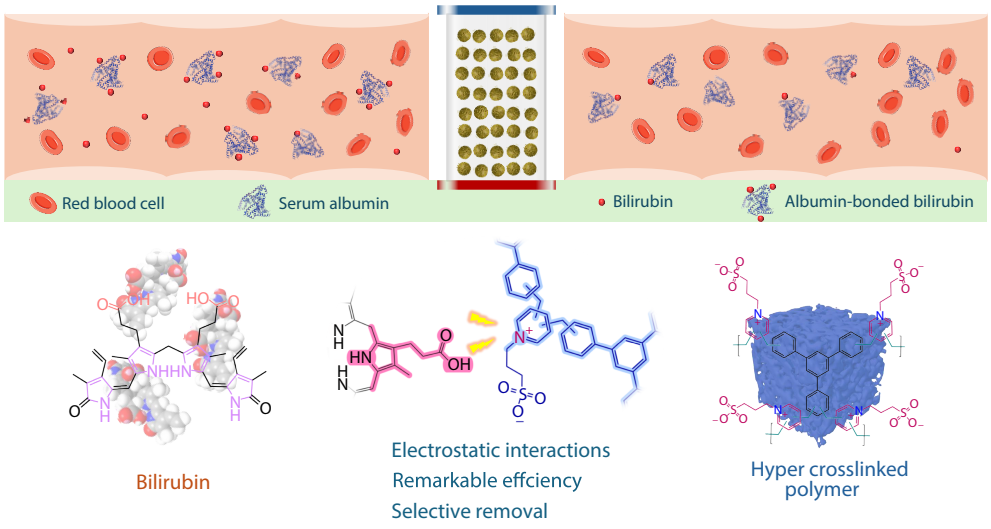
Chinese J. Polym. Sci. 2026, 44(1), 140–153 *https://doi.org/10.1007/s10118-025-3486-4*

Ionic Hyper Crosslinked Polymers as High Performance Hemoperfusion Adsorbent for Efficient Removal of Excessive Bilirubin

Hong-Xiang Yin, Yue-Yuan Xiao, Yu-Cheng Cai, Shuai-Lin He, Yang Wang, Gang-Shen Zhang, Cheng Zhang, Bi-En Tan, Irshad Hussain, and Wei Yan

Hubei University, China; Shenzhen Huazhong University of Science and Technology Research institute, China; Huazhong University of Science and Technology, China; Lahore University of Management Sciences (LUMS), Pakistan

By incorporating a cationic monomer into the cross-linked polymer framework, we introduced electrostatic interactions that enhance the polymer's affinity for bilirubin, resulting in outstanding adsorption performance and demonstrating its potential as an effective hemoperfusion adsorbent.



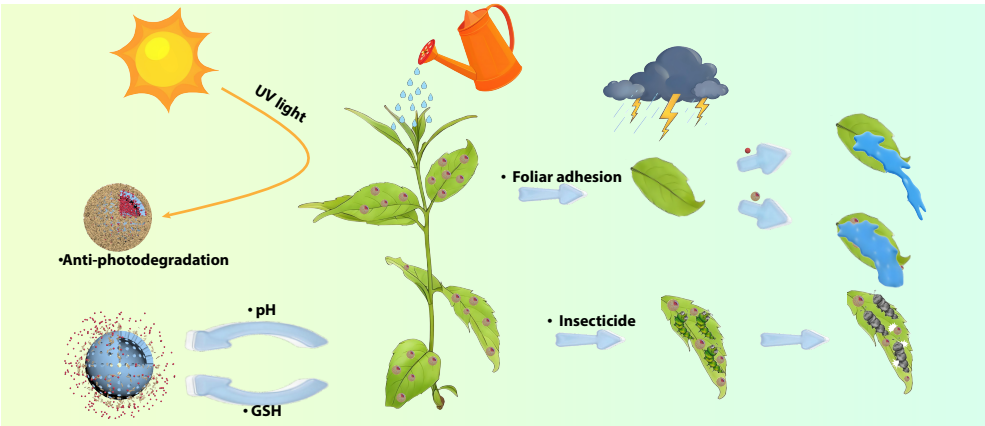
Chinese J. Polym. Sci. 2026, 44(1), 154–161 *https://doi.org/10.1007/s10118-025-3484-6*

pH/Glutathione Dual-stimuli-responsive Poly(acrylic acid)-coated Hollow Mesoporous Organosilica Nanospheres for Smart Pesticide Delivery

Peng Xu, Jia-Wei Bao, Qun Li, Wei-Shan Shi, Gang Xing, and Lei Yu

Nanjing Forestry University; Jiangsu Aijin Crop Science and Technology Group Co., Ltd.; Nanjing Institute of Technology

A pH/GSH dual-responsive nanopesticide system (Abamectin-HMONs@PAA) was developed for smart delivery. It exhibits enhanced photostability, controlled release in acidic/reducing environments, improved leaf adhesion, and superior insecticidal efficacy against Plutella xylostella, promoting sustainable crop protection.



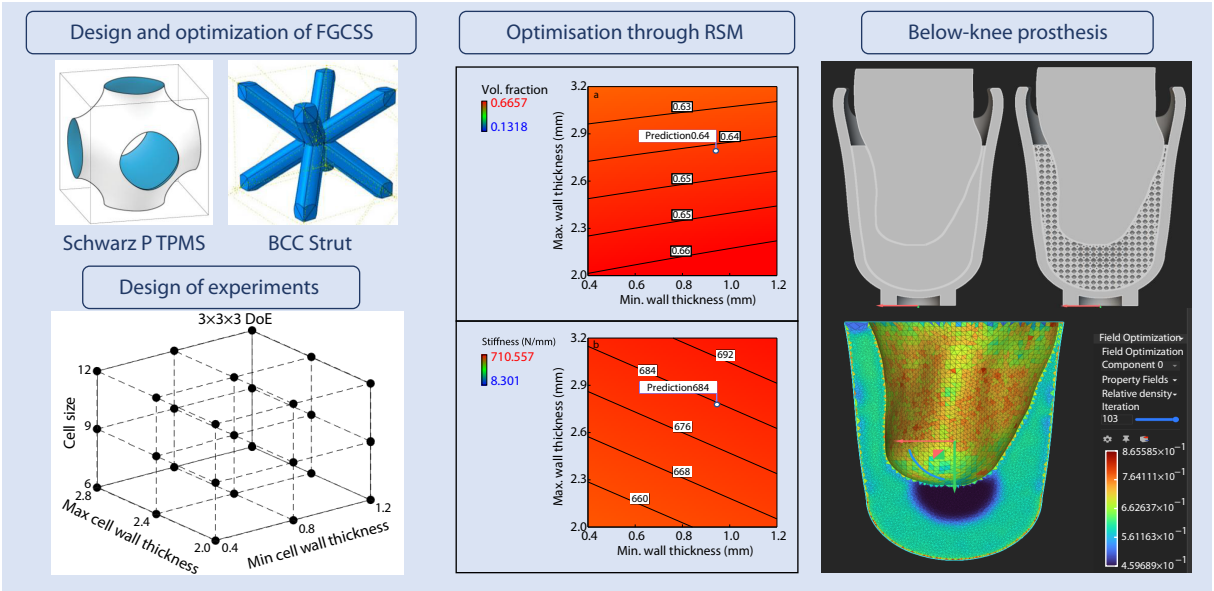
Chinese J. Polym. Sci. 2026, 44(1), 162–172 *https://doi.org/10.1007/s10118-025-3485-5*

Additive Manufacturing of Functionally Graded Lattice Structures for Personalized Below-Knee Prosthetic Dampers

Guy O'Keefe, Naser A. Alsaleh, Mahmoud A. El-Sayed, A. Jiménez, Sabbah Ataya, and Khamis Essa

University of Birmingham, UK; Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudi Arabia; Arab Academy for Science Technology and Maritime Transport, Egypt; Universidad de Navarra, Spain

This study analyzes two types of functionally graded lattice structures, Schwarz P and BCC, for use in below-knee prosthesis dampers. A 3×3 design of experiments varied wall thickness and cell size. Optimization *via* Response Surface Methodology and finite element analysis identified optimal lattice parmeters for improved prosthetic performance.



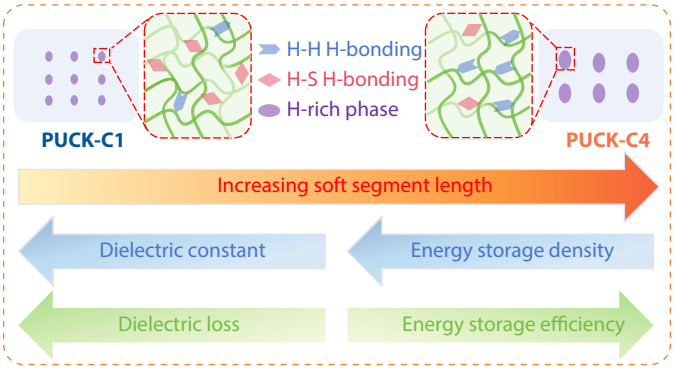
Chinese J. Polym. Sci. 2026, 44(1), 173–188 *https://doi.org/10.1007/s10118-025-3460-1*

Influence of Soft Segment Length on the Dielectric Polarization Behavior of Ketal-containing Polyurethane Elastomer

Xue Mei, Wan Lu, Jian-Rong Dong, Ke-Heng Pan, Jun-Jie Tan, Hong-Ye Yan, Jun Wu, Yu Zhou, and Hong-Xiang Chen

Wuhan University of Science and Technology; Hubei Normal University

The ketal-containing cross-linked polyurethane elastomers were prepared using cyclic ketal diol as a chain extender. As the soft segment length increases, the hard-soft hydrogen bonding decreases, while the hard-hard hydrogen bonding increases. As a result, the dielectric constant shows a decreasing trend, and the dielectric loss also gradually decreases.



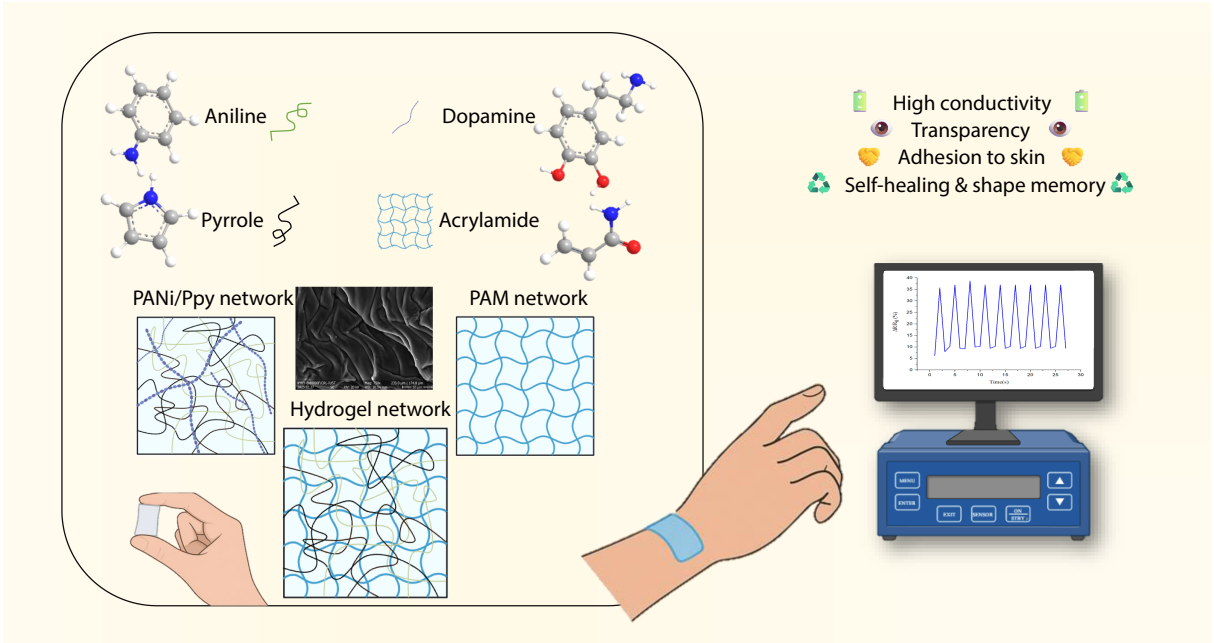
Chinese J. Polym. Sci. 2026, 44(1), 189–197 *https://doi.org/10.1007/s10118-025-3474-8*

Flexible Mussel-inspired Hydrogel with Polyaniline and Polypyrrole for Transparent Wearable Strain Sensors: Investigation of Physical Properties, Self-healing, and Electrical Conductivity

Ghazaleh Mirzaei, Akbar Mirzaei, and Shahrzad Javanshir

Iran University of Science and Technology, Iran

A mussel-inspired hydrogel incorporating polydopamine (PDA), polypyrrole (Ppy), polyaniline (PANi) and poly(vinylalcohol) (PVA) within a polyacrylamide (PAM) network delivers high transparency (about 90%), electrical conductivity (about 95.4×10^4 S/cm), tensile strength (about 32.6 kPa), and rapid self-healing (about 48% recovery in 1 h at 50 °C). It functions effectively as a flexible, wearable strain sensor with GF of approximately 7.44.



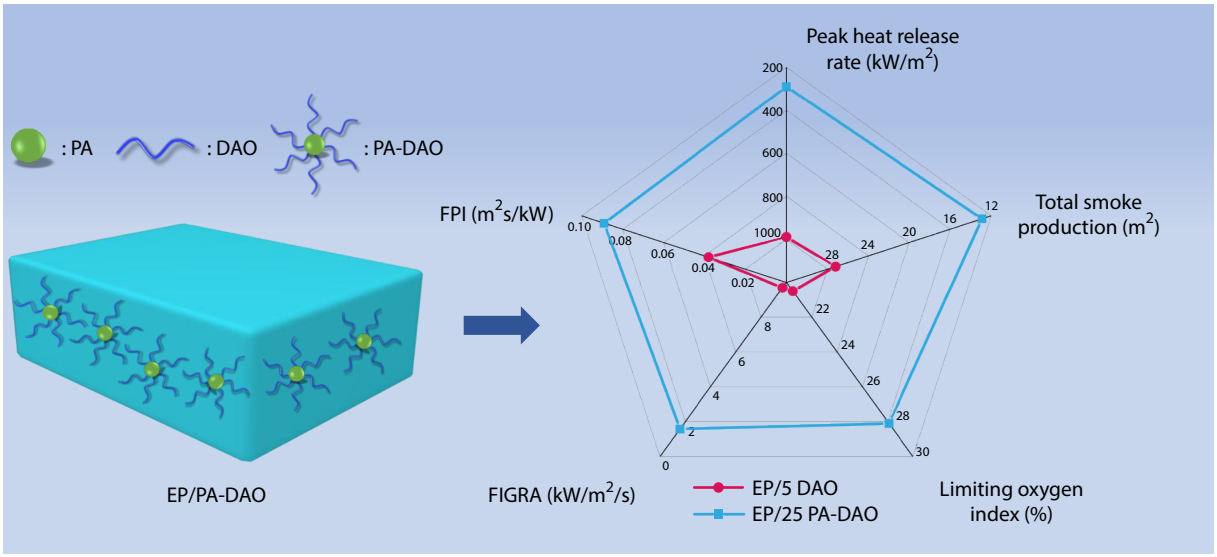
Chinese J. Polym. Sci. 2026, 44(1), 198–208 *https://doi.org/10.1007/s10118-025-3473-9*

Bio-derived Flame-retardant Curing Agents Enable One-step, Ambient Synthesis of Ultra-tough, Smoke-suppressed Epoxy

Hang-Tian Hu, Dan Xie, Zheng-Hong Guo, Feng-Qing Chen, Xing-Wei He, Gao-Bo Lou, Jin-Feng Dai, and Li-Na Liu

Zhejiang A&F University; Ningbo Tech University

Bio-based toughening flame retardant (PA-DAO) synthesized by a one-step neutralization method using phytic acid (PA) and 1,8-diaminooctane (DAO) at room temperature. Incorporation of 25 wt% PA-DAO increased the limiting oxygen index from 20.5% to 28.1% and achieved a UL-94 V-0 rating, concomitant with a 71% reduction in PHRR and 53% suppression of total smoke production (TSP).



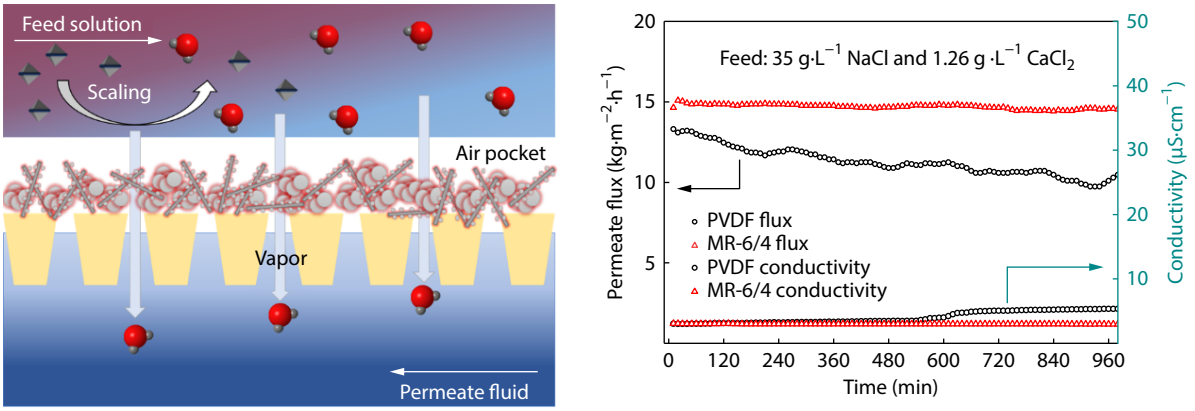
Chinese J. Polym. Sci. 2026, 44(1), 209–222 *https://doi.org/10.1007/s10118-025-3471-y*

Fabrication of Superhydrophobic Membrane *via* One-step Spraying Strategy Utilizing Organosilicon Chemistry and Its Performance in Membrane Distillation

Tian-Tian Li, Zheng Xu, Yu-Jing Zhang, Ming-Han Su, Shun-Da Liu, and Shao-Fei Zhang

Hebei University of Science and Technology

This study presents a one-step spraying strategy for fabricating a superhydrophobic composite membrane, significantly simplifying the preparation process. The resulting membrane demonstrates superstability and excellent scale resistance during membrane distillation (MD) tests, highlighting its strong potential for durable and efficient MD applications.



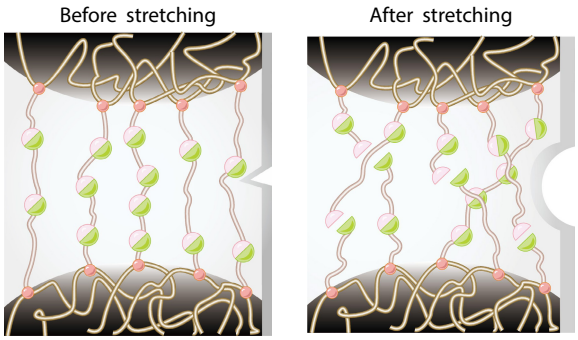
Chinese J. Polym. Sci. 2026, 44(1), 223–233 *https://doi.org/10.1007/s10118-025-3488-2*

Toughening Recycled Waste Rubbers by Dynamic Interactions for Stress Deconcentration

Hao-Jia Guo, Zhou-Liang Wu, Shuang-Quan Liao, and Ming-Chao Luo

Hainan University

When recycled wasted rubber (WR) is subjected to external stress, the loads are redistributed across a broad region of adjacent regions instead of being concentrated on a limited length scale, which resists crack propagation.



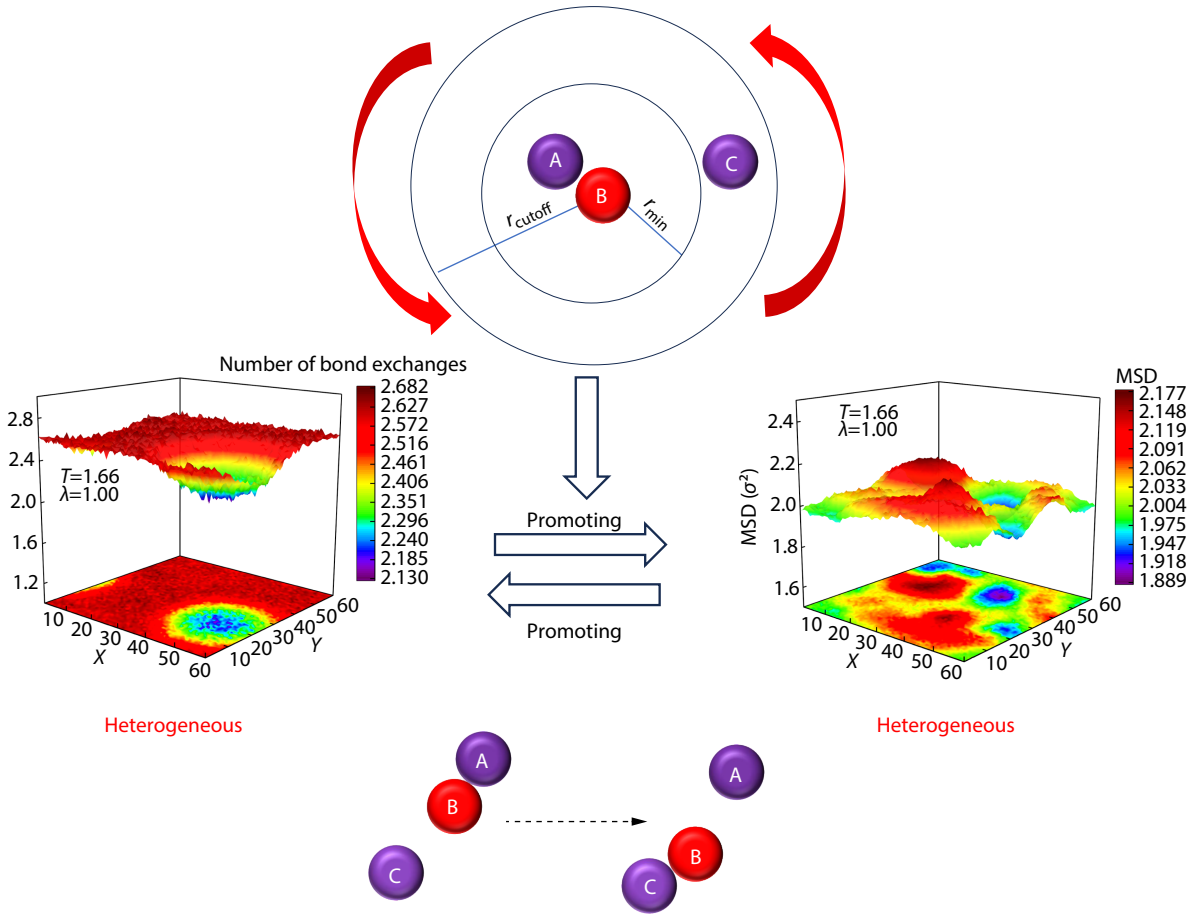
Chinese J. Polym. Sci. 2026, 44(1), 234–241 *https://doi.org/10.1007/s10118-025-3489-1*

Molecular Simulations of Dynamic Heterogeneity of Segment Motion and Bond Exchange in Polymer Vitrimers

Lang Shuai, Jiang-Long Li, Jian-Long Wen, Ying-Ying Xu, Shui Yu, Bo-Yu Ding, and Yi-Jing Nie

Jiangsu University

This study employs molecular dynamics simulations to visually elucidate the dynamic bond exchange processes in vitrimers. It investigates the coupling between bond exchange kinetics and segmental dynamics, as well as the dynamic heterogeneity induced by varying bond exchange rates.



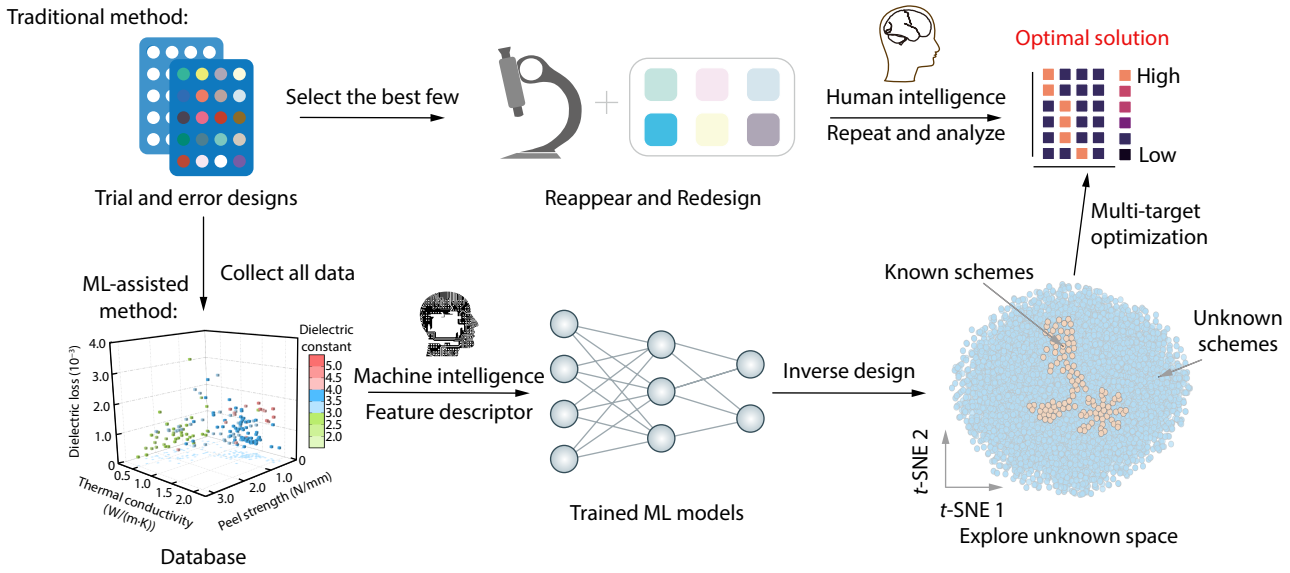
Chinese J. Polym. Sci. 2026, 44(1), 242–255 *https://doi.org/10.1007/s10118-025-3472-x*

Machine Learning-assisted Discovery of Multifunctional Coordination in Multicomponent Composites

Zi-Ran Guo, Sen Xue, Lu He, Zi-Long Xie, Tian-Hao Yang, and Qiang Fu

Sichuan University

Machine learning-assisted formulation optimization of multicomponent composites offers an efficient and effective alternative to traditional trial-and-error experiment.



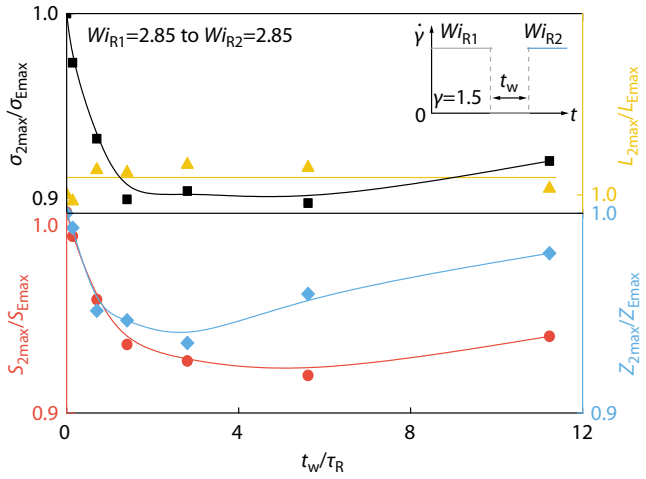
Chinese J. Polym. Sci. 2026, 44(1), 256–267 *https://doi.org/10.1007/s10118-025-3479-3*

Nonmonotonic Stress Overshoot in Entangled Polymer Melts under Two-step Shear

Yong-Jin Ruan, Ya-Qing Chang, Jiang-Yang Mo, and Bai-Cheng Mei

Changchun Institute of Applied Chemistry, Chinese Academy of Sciences; Changchun Institute of Technology; Dezhou University; Beijing Institute of Technology

Molecular dynamics simulations uncover the microscopic origin of the second stress overshoot σ_{2max} in two-step shear. The nonmonotonic σ_{2max} results from coupled variations of tube orientation and entanglement number, highlighting the need for a unified theoretical framework.



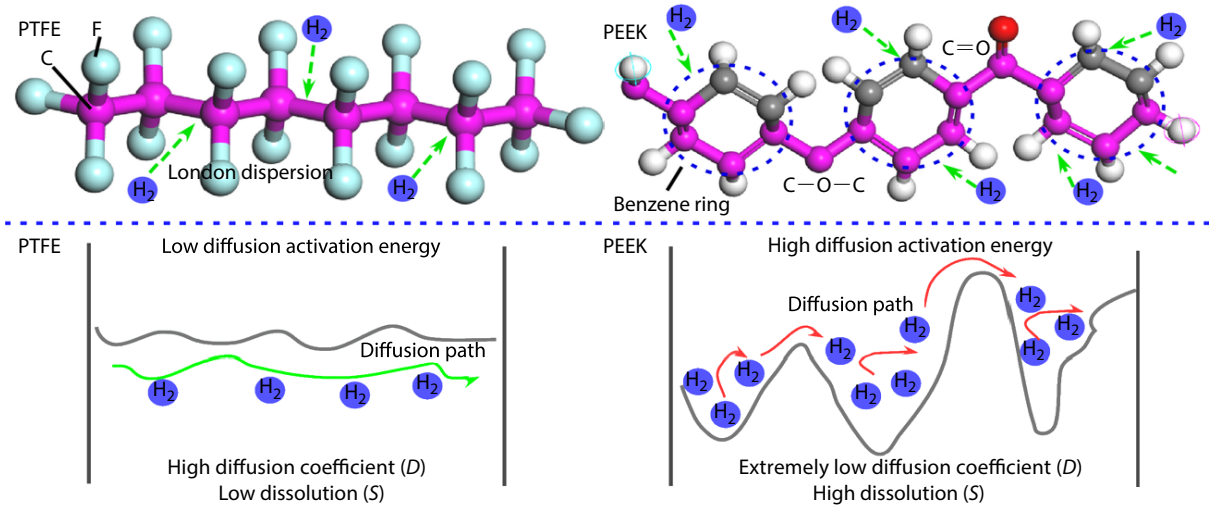
Chinese J. Polym. Sci. 2026, 44(1), 268–277 *https://doi.org/10.1007/s10118-025-3481-9*

Revealing the Hydrogen Permeation Mechanism in Polyetheretherketone and Polytetrafluoroethylene: From Experimental Validation to Molecular-level Interpretation

Hong-Lin Zhang, Wen-Tao Hu, Jie Xiao, Tian-Lei Li, and Yuan-Hua Lin

Southwest Petroleum University; China Petroleum Engineering Construction Corporation Southwest Branch

Polyetheretherketone (PEEK) exhibits a superior hydrogen barrier performance over polytetrafluoroethylene (PTFE). Our integrated study reveals an enthalpy-driven mechanism: strong non-covalent interactions enhance solubility but create kinetic traps that severely suppress diffusion. This provides a new, enthalpy-based strategy for designing advanced barrier materials.



P_{PEEK} = High S multiplied by extremely low D = Low P
P_{PTFE} = Low S multiplied by high D = High P

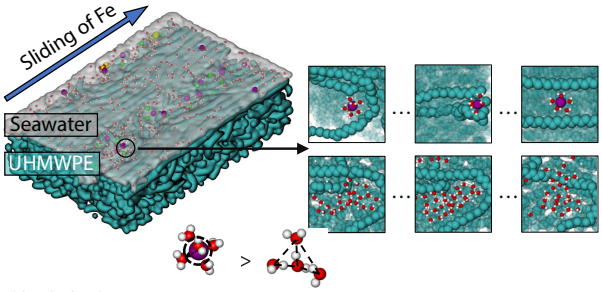
Chinese J. Polym. Sci. 2026, 44(1), 278–298 *https://doi.org/10.1007/s10118-025-3483-7*

Molecular Investigations on the Diffusion of Hydrated Ions and Its Effects on the Plastic Deformation of Ultra-high Molecular Weight Polyethylene at Seawater Condition

Qi-Hao Cheng, Ting Zheng, Gang Yang, and Hui-Chen Zhang

Dalian Maritime University; Dalian University

Friction rearranges polyethylene chains, creating gaps. Hydrated ions and water clusters diffuse into ultra-high molecular weight polyethylene (UHMWPE) substrate, further disentangling the polyethylene chains under friction. Rigid hydrated ions exert a stronger effect than water clusters.



Chinese J. Polym. Sci. 2026, 44(1), 299–313 *https://doi.org/10.1007/s10118-025-3487-3*

Errata

Erratum to "Amine-reactive Polymer Platform for Engineering Surface Modification of Next-generation Sequencing Chips"

Wei Tian, Xin-Yuan Wang, Die-Wen Feng, Xiang-Qian Li, Yue-Kang Jin, Hui Li, and Hao Liu

Donghua University; Salus BioMed Company; University of Science and Technology of China

Chinese J. Polym. Sci. 2026, 44(1), 314–314 *https://doi.org/10.1007/s10118-025-3480-x*