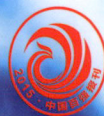




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# 化学学报

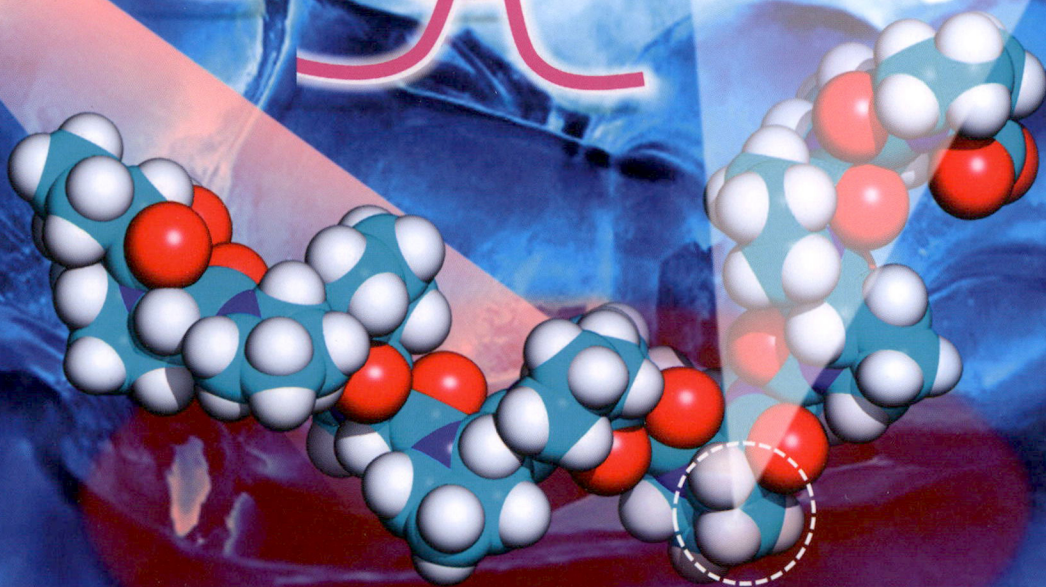
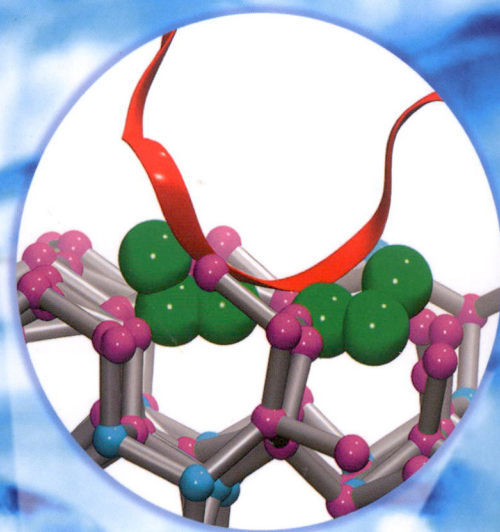
## ACTA CHIMICA SINICA

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主办



# 化学学报

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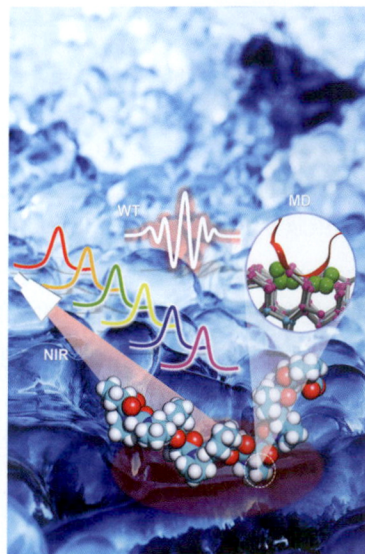
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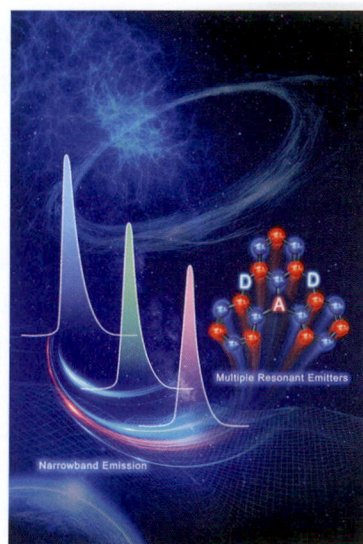
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\* 通信联系人.

**On the front cover:** Molecular mechanism of inhibiting ice growth by antifreeze agents can be investigated using a combination of near-infrared spectroscopy, chemometric methods and molecular dynamics simulations. The aim of this Account is to provide new ideas for the study of antifreeze mechanisms, and thus to deepen our understanding of the molecular details of the antifreeze mechanism. [Shao, Xueguang *et al.* on page 1167-1174.]

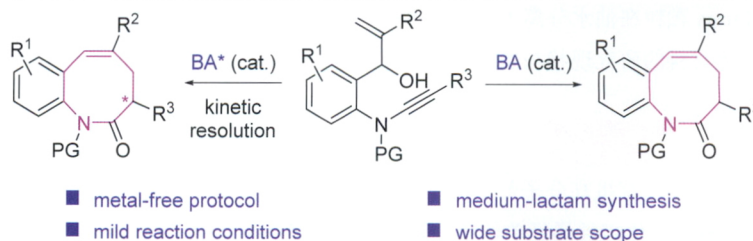


**On the back cover:** Multiple resonant emitters developed by introducing electron-withdrawing and electron-donating atoms in polycyclic aromatic hydrocarbon skeletons exhibit extraordinary characteristics of narrowband emission. In this review, recent advances of multiple resonant emitters are summarized from the perspective of materials and devices. [Wang, Lixiang *et al.* on page 1202-1214.]



### Communication

#### Brønsted Acid-Catalyzed Intramolecular Hydroalkoxylation/Claisen Rearrangement of Ynamides



Zhai, Tongyi; Ge, Chang; Qian, Pengcheng\*; Zhou, Bo; Ye, Longwu\*

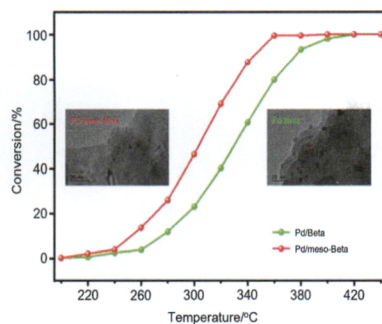
*Acta Chim. Sinica* **2023**, 81(9), 1101-1107

A Brønsted acid-catalyzed intramolecular hydroalkoxylation/Claisen rearrangement of ynamides has been developed for the synthesis of eight-membered lactams. This metal-free protocol exhibits broad substrate scope under mild reaction conditions. Preliminary studies have been conducted to the chiral Brønsted acid-catalyzed kinetic resolution of alcohol tethered ynamides, leading to several chiral eight-membered lactams successfully.

## Enhanced Performance for Mesoporous Beta Zeolites Supported Pd in the Methane Catalytic Combustion

Xu, Xupan; Fan, Kai; Zhao, Shengze; Li, Jian; Gao, Shan; Wu, Zhongbiao; Meng, Xiangju\*; Xiao, Feng-Shou

*Acta Chim. Sinica* **2023**, *81*(9), 1108-1112

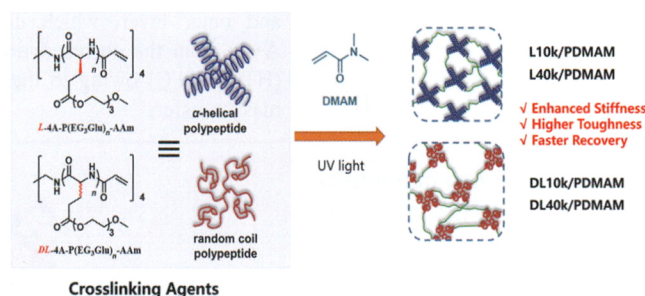


Mesoporous Beta zeolites supported Pd showed enhanced catalytic performance in the catalytic combustion of methane due to smaller and more reducible Pd species.

## Preparation and Material Properties of $\alpha$ -Helical Polypeptides Crosslinked Hydrogel

Zhang, Zhengchu; Xiong, Wei\*; Lu, Hua\*

*Acta Chim. Sinica* **2023**, *81*(9), 1113-1119

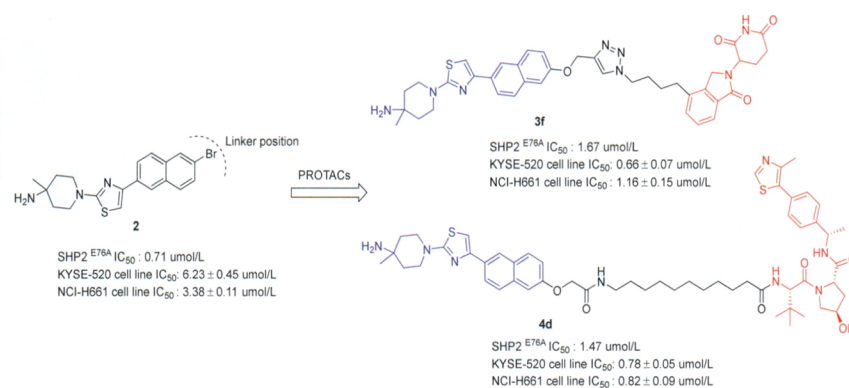


The hydrogel crosslinked with  $\alpha$ -helical polypeptides exhibited greater rigidity, higher toughness, and faster recovery compared with the hydrogel crosslinked by random coil polypeptides, demonstrating the characteristics of  $\alpha$ -helices as molecular springs.

## Small Molecule Degradable Targeting the SHP2<sup>E76A</sup> Mutant Effectively Inhibiting the Proliferation of Wild-type and Mutant SHP2 Dependent Tumor Cells

Kong, Jiao; Du, Lin; Li, Xiangyang; Zhu, Jidong\*; Long, Ya-Qiu\*

*Acta Chim. Sinica* **2023**, *81*(9), 1120-1128



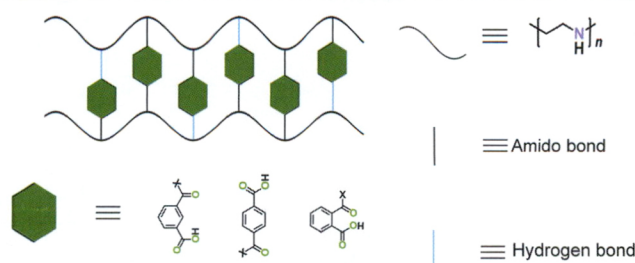
Src homology 2 domain-containing phosphatase 2 (SHP2) plays an important role in promoting tumor growth and T cell inactivation. The gain-of-function mutation renders SHP2 in a pathological active conformation and resistant to SHP2 wild-type allosteric inhibitors. Herein, novel SHP2 PROTACs (proteolysis-targeting chimeras) by employing an allosteric inhibitor targeting SHP2-activated mutant as the warhead were designed, exhibiting strong inhibitory activities in both enzyme and cell proliferation against the wild-type SHP2 human esophageal squamous carcinoma KYSE-520 and the mutant SHP2<sup>N58S</sup> human large-cell lung carcinoma NCI-H661 cell lines, with an improvement by 5 to 10-fold compared to the positive control 2.

## Article

## Ultra-Long Organic Room Temperature Phosphorescence of Phthalic Acid Derivative Modified Polymer

Tian, Ye; Si, Duanhui; Gao, Shuiying\*; Cao, Rong\*

*Acta Chim. Sinica* **2023**, *81*(9), 1129-1134



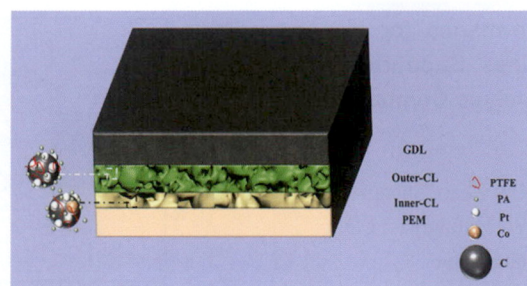
The ultra-long organic room temperature phosphorescence of polymers is achieved by the donor-acceptor system. The energy transfer between polymers and phosphorescent molecules provides a way for further development of phosphorescent polymers.



### Design and Study on Pore Structure of Cathode Double Catalytic Layer in High-temperature Proton Exchange Membrane Fuel Cell

Liu, Shikun; Deng, Chengwei; Ji, Feng; Min, Yulin\*; Li, Hexing\*

*Acta Chim. Sinica* **2023**, 81(9), 1135-1141

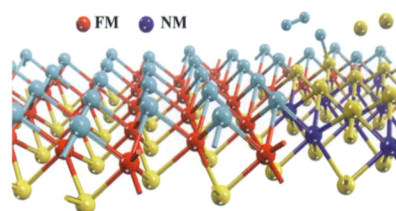


The cathode double catalytic layer (DCL) with unique pore structure is designed by using desired amount of ammonium bicarbonate as pore-forming agents at inner layer and outer layer, which displays best electrochemical performance ( $0.531\text{ V}@0.5\text{ A}\cdot\text{cm}^{-2}$ ) in the corresponding high-temperature proton exchange membrane fuel cell (HT-PEMFC) owing to the improvement of phosphoric acid distribution and oxygen mass transfer.

### Room-Temperature Ferromagnetism in Two-Dimensional Janus Titanium Chalcogenides

Zhang, Kai; Wu, Xiaojun\*

*Acta Chim. Sinica* **2023**, 81(9), 1142-1147

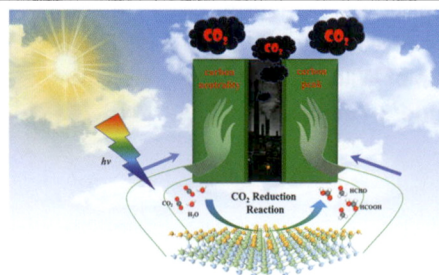


Janus monolayers with room-temperature ferromagnetism can be realized by H/F substitution of non-magnetic titanium chalcogenides.

### Density Functional Theory Study of Janus $\text{In}_2\text{S}_2\text{X}$ Photocatalytic Reduction of $\text{CO}_2$ under "Double Carbon" Target

Wu, Yuhua; Zhang, Dongdong; Yin, Hongyu; Chen, Zhengnan; Zhao, Wen; Chi, Yuhua\*

*Acta Chim. Sinica* **2023**, 81(9), 1148-1156

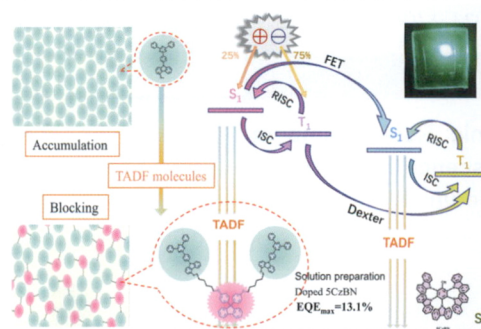


Janus  $\text{In}_2\text{S}_2\text{X}$  has a built-in electric field perpendicular to the surface, which can effectively facilitate carrier separation. It also has excellent visible light absorption and edge potential suitable for  $\text{CO}_2$  reduction. More importantly, it was found that the vacancy concentration could effectively control the selectivity of the reduction products. Catalysts with single and double vacancy surfaces reduce  $\text{CO}_2$  to  $\text{HCOOH}$  and  $\text{HCHO}$ , respectively, further revealing the mechanism of how the vacancy concentration affects the catalytic performance. The results of this work provide theoretical guidance for the design and synthesis of highly active catalytic materials for energy conversion and environmental remediation.

### Design, Synthesis and Electroluminescence Performance of Flexible Fluorenyl Block Delayed Fluorescence Dimers

Ge, Fengjie; Zhang, Kaizhi; Cao, Qingpeng; Xu, Hui; Zhou, Tao; Zhang, Wenhao; Ban, Xinxin\*; Zhang, Xiaobo\*; Li, Na\*; Zhu, Peng

*Acta Chim. Sinica* **2023**, 81(9), 1157-1166



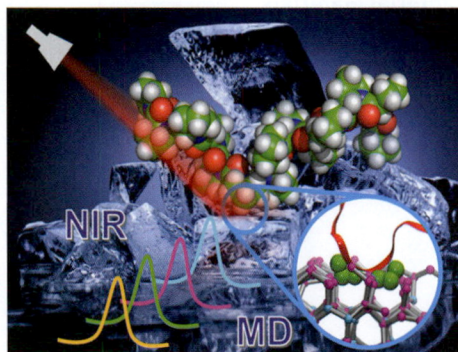
A new thermally-activated delayed fluorescence (TADF) molecule was synthesized with triazine-carbazole as the matrix unit by flexible fluorene blocking strategy, and the new TADF molecule showed higher solubility and device performance, and on this basis, the external quantum efficiency of 13.1% was reached after doping with penta-carbazolylbenzonitrile (SCzBN).

Account

# Antifreeze Mechanism of Antifreeze Agents by Near Infrared Spectroscopy and Molecular Simulations

Wang, Haipeng; Cai, Wensheng; Shao, Xueguang\*

*Acta Chim. Sinica* **2023**, 81(9), 1167-1174



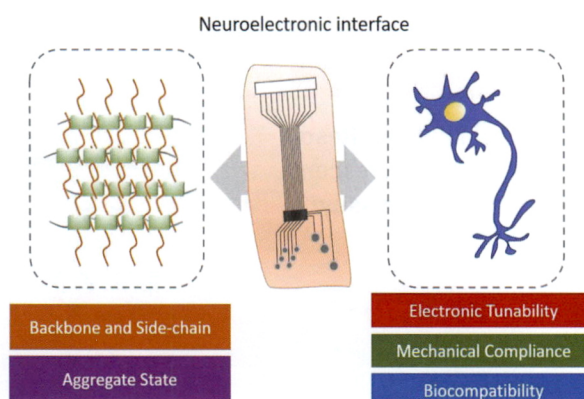
Molecular mechanism of inhibiting ice growth by antifreeze agents can be investigated using a combination of near-infrared spectroscopy, chemometric methods and molecular dynamics simulations.

Perspective

# Advances and Perspectives on Organic Materials for Neuroelectronic Interface Devices

Jia, Lingxuan; Zhan, Zepang; He, Zihan\*; Di, Chong-an\*; Zhu, Daoben

*Acta Chim. Sinica* **2023**, 81(9), 1175-1186

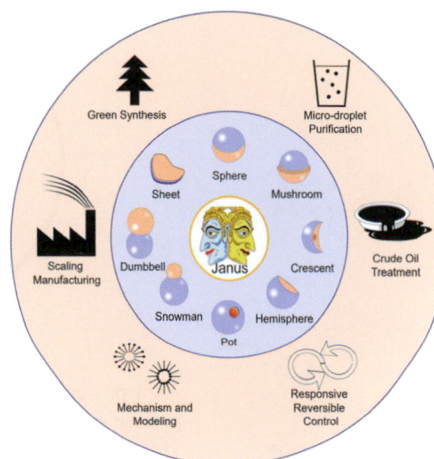


With the rise of bioelectronics and intelligent systems, the development of organic materials towards neuroelectronic interface has become a cutting-edge area. By modulating the backbone, side-chain and aggregate state of organic materials, artificial neuroelectronic interface can not only serve as intelligent sensors, but can also integrate with biological interface to create neural prosthetic device. This perspective introduces the related research progress on electronic tunability, mechanical compliance to biocompatibility, and hopes to give a blueprint in this emerging frontier.

# Application Progress of Emerging Janus Particles for Oil-Water Separation

Wang, Duanda; Shen, Xinyi; Song, Yongyang\*; Wang, Shutao\*

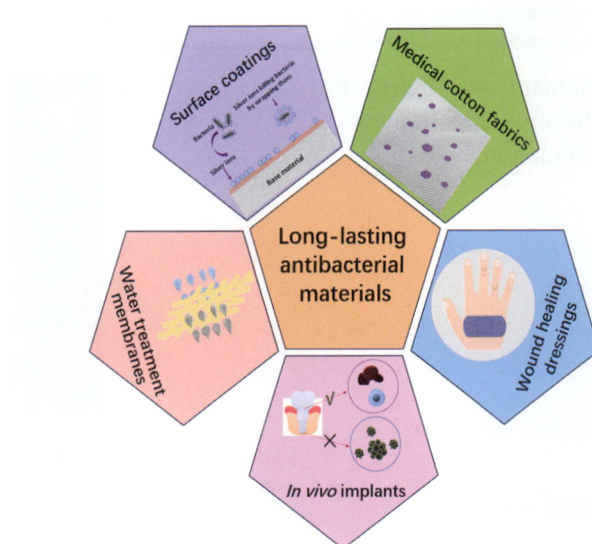
*Acta Chim. Sinica* **2023**, 81(9), 1187-1195



A strategy-oriented perspective reviews the Janus particles for oil-water separation with their design and how Janus properties achieves or enhances performance, subsequently extends to situational discussions on unsolved problems and potential applications.



## Retrospect and Prospect of Long-lasting Antibacterial Materials



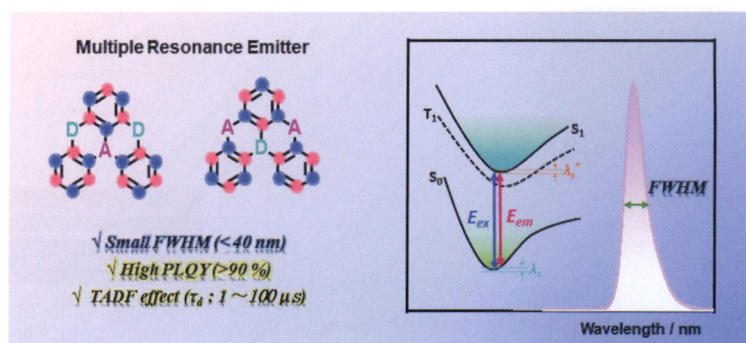
Han, Yuchun\*; Wang, Yilin\*

*Acta Chim. Sinica* **2023**, *81*(9), 1196-1201

Long-lasting antibacterial materials have shown excellent application prospects in surface coatings, medical cotton fabrics, wound healing dressings, *in vivo* implants, and bacterial water treatment membranes.

## Review

### Recent Advances in Multiple Resonance Organic/Polymer Fluorescent Materials with Narrowband Emission

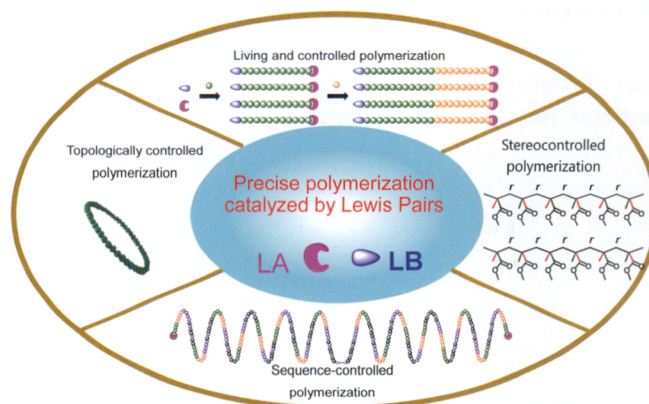


Wang, YINUO; Shao, Shiyang\*; Wang, Lixiang\*

*Acta Chim. Sinica* **2023**, *81*(9), 1202-1214

Recent advances in multiple resonance organic/polymer fluorescent materials with narrowband emissions are summarized from the perspective of materials and devices in this review.

### Research Progress in Precision Polymerization of Polar Olefin Monomers by Lewis Pairs



Wan, Yi; He, Jianghua\*; Zhang, Yuetao\*

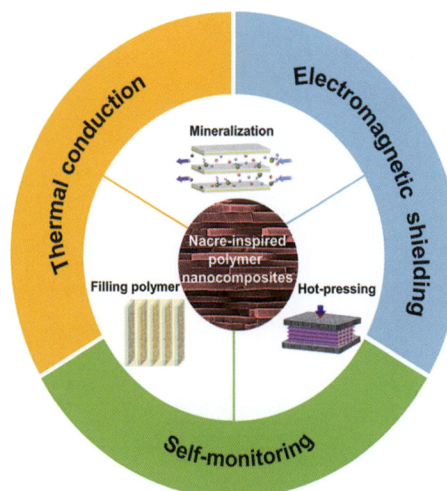
*Acta Chim. Sinica* **2023**, *81*(9), 1215-1230

As a powerful polymerization strategy, Lewis pair polymerization (LPP) has achieved precise control over the molecular weight and molecular weight distribution of the polymers as well as the polymer topology, sequence and stereochemical structure. LPP has provided a new way for precise synthesis of polymers and construction of functional polymeric materials.

## Recent Advances in the Nacre-inspired Layered Polymer Nanocomposites by Ice Templating Technique

Wang, Huagao; Cheng, Qunfeng\*

*Acta Chim. Sinica* **2023**, 81(9), 1231-1239

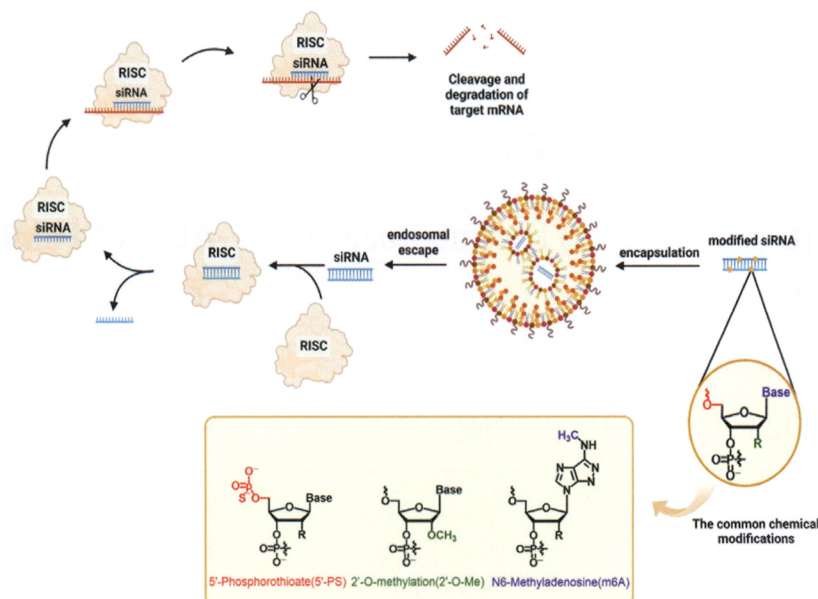


Inspired by natural nacre, the layered polymer nanocomposites constructed by ice templating technique not only possess high-performance mechanical properties, but also impart them a wide range of functional applications. This work presents a timely and systematic investigation and summary of frontier progresses of layered polymer nanocomposites constructed by the ice templating technique.

## Chemical Modification and Delivery System of Small Interfering RNA Drugs

Li, Chen; Si, Xiao; Li, Jinbo\*; Zhang, Yan\*

*Acta Chim. Sinica* **2023**, 81(9), 1240-1254

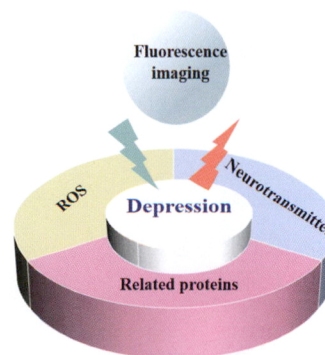


Small interfering RNAs (siRNAs) that cause gene silencing are chemically modified and encapsulated by liposome nanoparticles. The liposome nanodelivery vector was absorbed into the cell and successfully released siRNA to achieve disease therapy.

## Fluorescence Imaging of Active Molecules Associated with Depression

Che, Feida; Zhao, Xiaoming; Zhang, Xin; Ding, Qi; Wang, Xin\*; Li, Ping\*; Tang, Bo\*

*Acta Chim. Sinica* **2023**, 81(9), 1255-1264



The fluorescence imaging methods of reactive oxygen species (ROS), neurotransmitters and related proteins in active molecules related to depression in the past five years are reviewed with focus on the development of fluorescence probes and prospects.



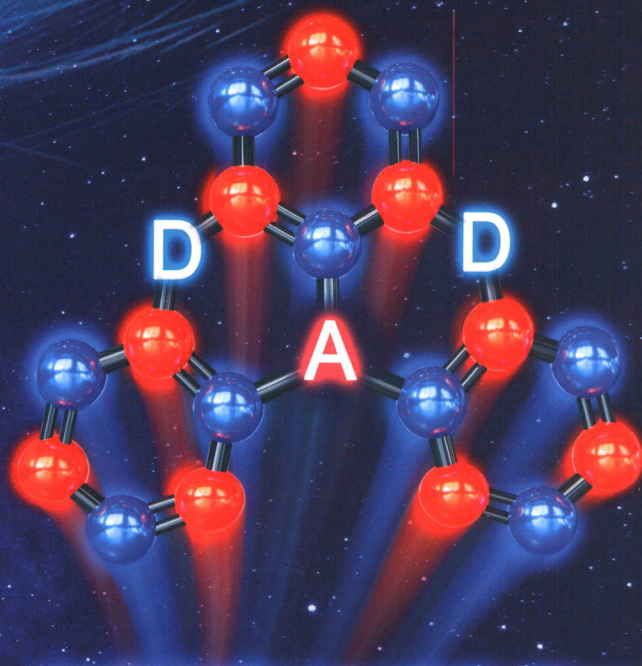
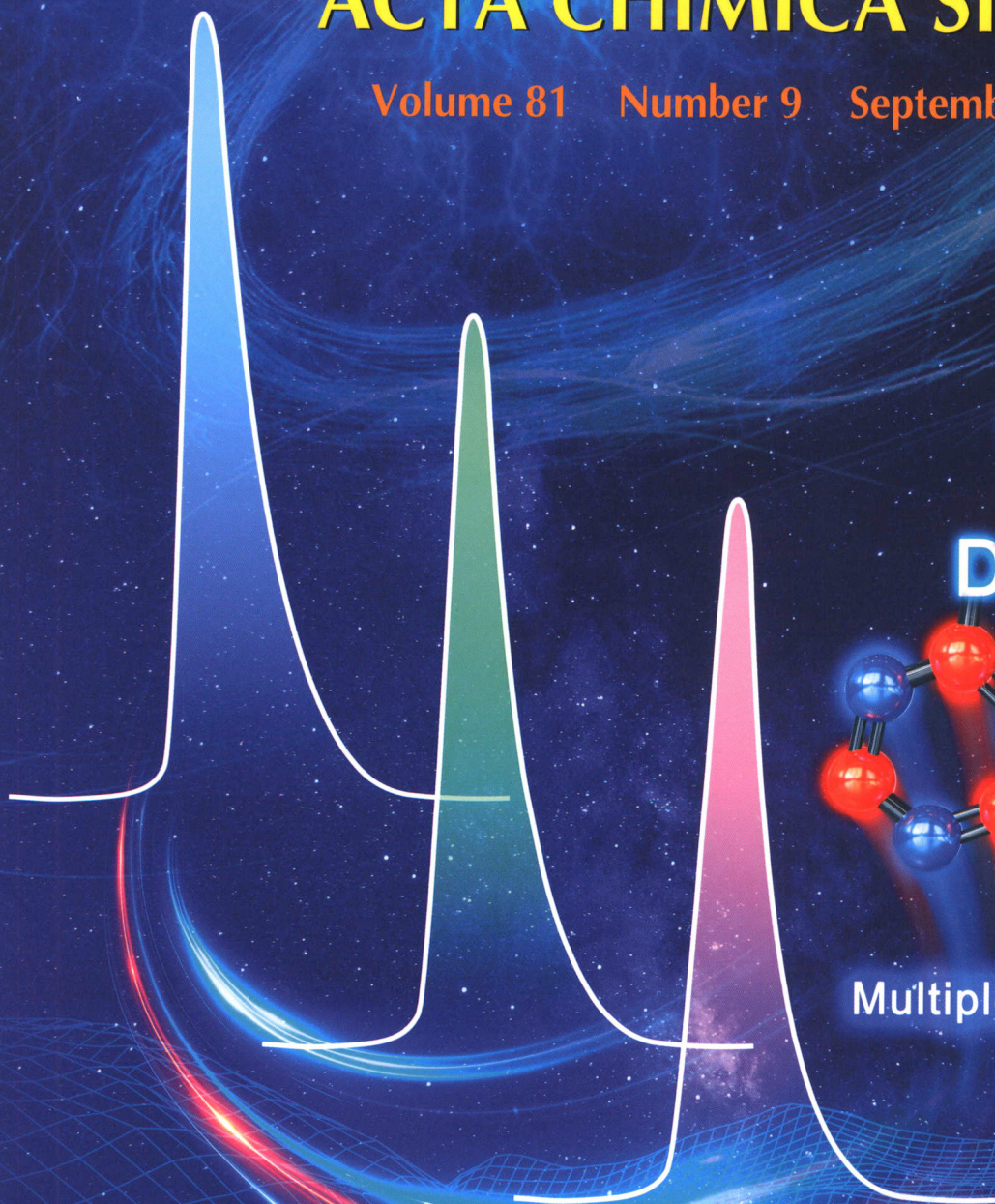


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# 化学学报

## ACTA CHIMICA SINICA

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Multiple Resonant Emitters

Narrowband Emission



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