

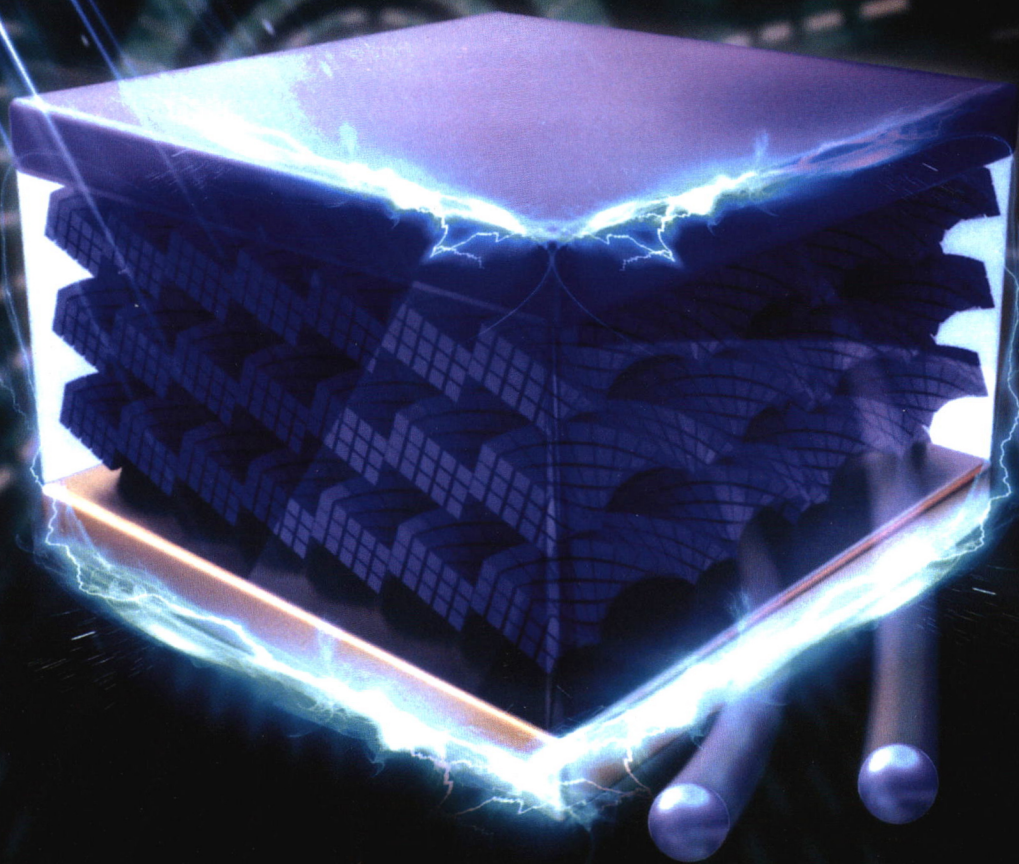


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化学学报

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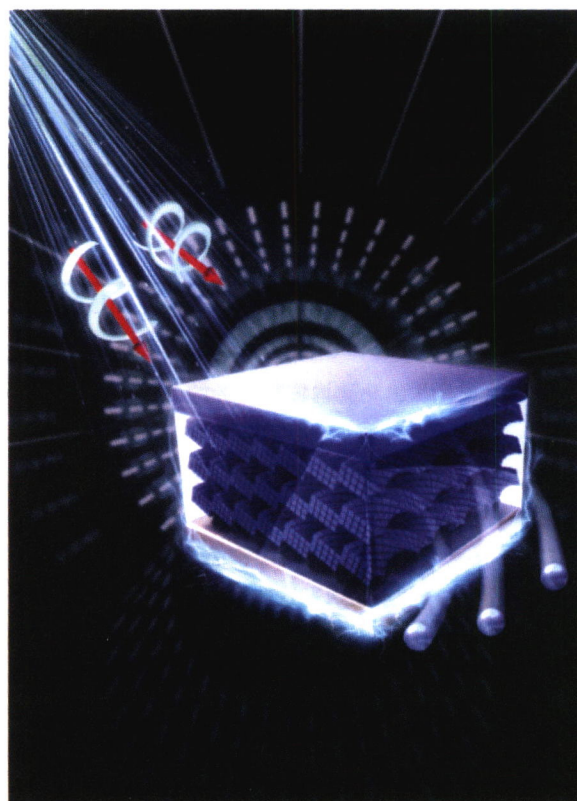
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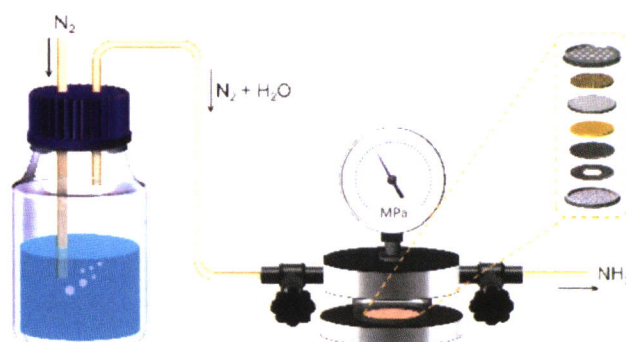
* 通信联系人.

On the cover: The incorporation of chirality into organic semi-conducting materials can not only control their aggregation states by virtue of the unique non-covalent interactions among chiral molecules to regulate electronic/optoelectronic properties, but also facilitates the emergence and development of circularly polarized light direct luminescence and detection. This review summarizes the research progress of chiral organic optoelectronic materials and devices in recent years, aiming to promote the development of relevant research in the field of chiral optoelectronics. [Wei, Zhixiang *et al.* on page 970-992.]



Communication

“Continuous” Nitrogen Reduction Synthesis of Ammonia Based on Li-N₂ Battery System

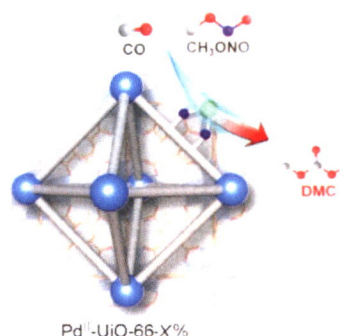


Ma, Xingyu; Sun, Hui*; Li, Jiang; Liu, Zhiyang; Zhou, Hongjun

Acta Chim. Sinica **2022**, 80(7), 861-866

This work, innovatively combining Li-N₂ battery and Li-mediated N₂ reduction, not only utilizes the discharge reaction to fix N₂, but also co-reacts Li, N₂ and proton source (H₂O here) to produce NH₃. During the discharge process, NH₃ generates continuously when N₂ and H₂O are fed together through the gas diffusion layer in the cathode, and the discharge potential in experiment is close to the theoretical value.

MOF-Stabilized Pd Single Sites for CO Esterification to Dimethyl Carbonate

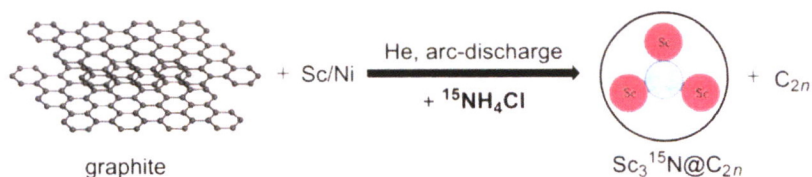


Xie, Chenfan; Xu, Yu-Ping; Gao, Ming-Liang; Xu, Zhong-Ning; Jiang, Hai-Long*

Acta Chim. Sinica **2022**, *80*(7), 867-873

The Pd^{II}-UiO-66-X% is fabricated and exhibits high dimethyl carbonate (DMC) selectivity and stability in the reaction of CO esterification reaction, thanks to the good dispersion and strong interaction of Pd(II) and the metal-organic framework (MOF) support.

Synthesis and Characterizations of ¹⁵N Isotope Labeling Metal Nitride Clusterfullerene

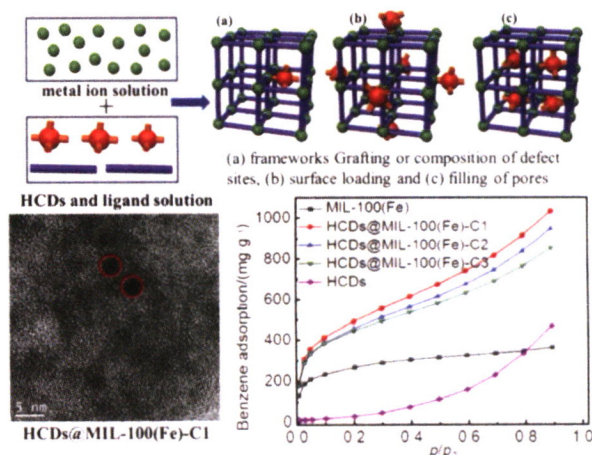


Qiu, Ling; Liang, Jiayi; Zhang, Zhuxia*; Wang, Taishan*

Acta Chim. Sinica **2022**, *80*(7), 874-878

¹⁵N-labeled metal nitride clusterfullerenes were prepared by the Krätschmer-Huffman arc-discharge method. The prepared ¹⁵N-labeled metal nitride clusterfullerenes contain more than 98% of the ¹⁵N isotope. In the preparation process, ¹⁵NH₄Cl is used as a solid nitrogen source. We separated and characterized Sc₃¹⁵N@C₈₀ by matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) mass spectrometry, ultraviolet-visible (UV-Vis) absorption spectroscopy and carbon-13 nuclear magnetic resonance spectroscopy (¹³C NMR), demonstrating the existence of ¹⁵N and I_h-C₈₀ carbon cage for Sc₃¹⁵N@C₈₀.

Research on Preparation and Benzene Adsorption Performance of HCDs@MIL-100(Fe) Adsorbents



Liu, Fang; Pan, Tingting; Ren, Xiurong; Bao, Weiren; Wang, Jiancheng; Hu, Jiangliang*

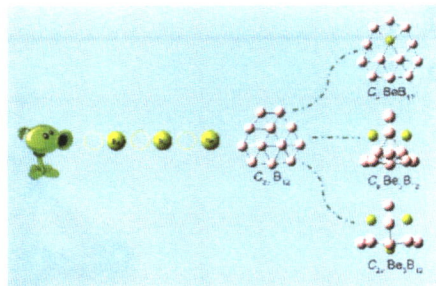
Acta Chim. Sinica **2022**, *80*(7), 879-887

Hydrophobic carbon dots (HCDs) interact with the metal sites of MIL-100(Fe), leading to the generation of defect sites; HCD is also loaded on the crystal surface to form a tight interfacial layer with the MIL-100(Fe) crystal. In addition, HCDs are packed into mesoporous channels. Through these interactions, HCDs successfully combined with MIL-100(Fe) to prepare hierarchical porous composite adsorbents with high specific surface area and high benzene adsorption capacity.

Study on the Regulation of Alkali-earth Metal Be_n ($n = 1 \sim 3$) on the Structure of B_{12} Clusters

Li, Hairu*; Zhang, Ceng; Li, Sidian

Acta Chim. Sinica 2022, 80(7), 888-895

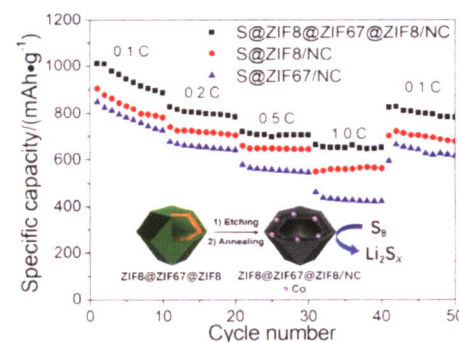


The quasi-planar $\text{C}_{3v} \text{B}_{12}$ cluster gradually transformed into the quasi-planar $\text{C}_s \text{BeB}_{12}$ and the cage-like structures $\text{C}_s \text{Be}_2\text{B}_{12}$ and $\text{C}_{2v} \text{Be}_3\text{B}_{12}$ with the increase of the number of Be atoms.

Structural Regulation of Metal Organic Framework-derived Hollow Carbon Nanocages and Their Lithium-Sulfur Battery Performance

He, Jiawei; Jiao, Liu; Cheng, Xueyi; Chen, Guanghai; Wu, Qiang*; Wang, Xizhang; Yang, Lijun; Hu, Zheng*

Acta Chim. Sinica 2022, 80(7), 896-902



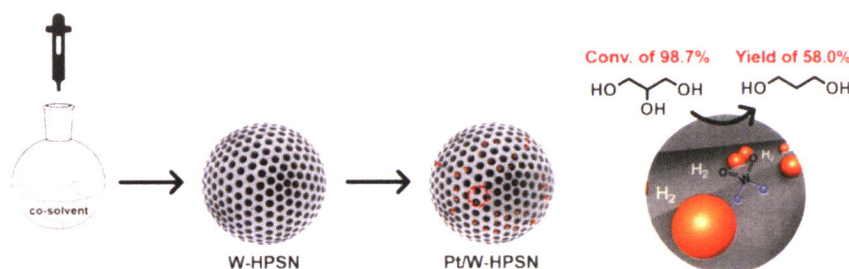
the sulfur utilization of the cathodes.

The hollow carbon nanocages host for lithium-sulfur batteries was prepared by etching ZIF8@ZIF67@ZIF8 particles followed by carbonization, which presented better rate and cycling performances than the counterparts derived from ZIF8 and ZIF67 . The superior performance of the former was closely related to its unique porous structure and the coexisting electrocatalytically active Co species, which effectively suppressed the shuttle and polarization effects and thus improved

W-doped Hierarchically Porous Silica Nanosphere Supported Platinum for Catalytic Glycerol Hydrogenolysis to 1,3-Propanediol

Zeng, Yang; Jiang, Lan; Zhang, Xiaoxin; Xie, Songhai; Pei, Yan; Qiao, Minghua*; Li, Zhen-Hua; Xu, Hualong; Fan, Kangnian; Zong, Baoning*

Acta Chim. Sinica 2022, 80(7), 903-912



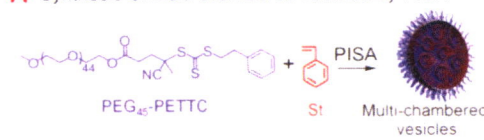
In glycerol hydrogenolysis, the Pt/W-HPSN (hierarchically porous SiO_2 nanospheres) catalysts prepared from the W-HPSN synthesized with the addition of alcohols as the co-solvents afforded the improved 1,3-propanediol (1,3-PDO) yield of 58.0% at glycerol conversion of 98.7%. On the basis of characterization results, we propose that smaller Pt particle size and more *in-situ* generated Brønsted acid sites are conducive to a better catalytic performance of the Pt/W-HPSN catalyst.

Preparation of Multi-chambered Vesicles by Polymerization-Induced Self-assembly and the Influence of Solvophilic Fragments in the Core-forming Blocks

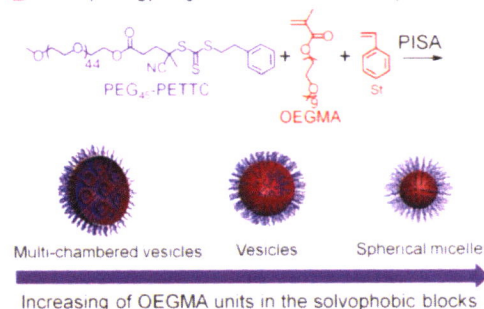
Kadirkhanov Jamshid; Zhong, Feng*; Zhang, Wenjian; Hong, Chunyan*

Acta Chim. Sinica 2022, 80(7), 913-920

A Synthesis of multi-chambered vesicles by PISA



B Morphology degradation of the nano-objects

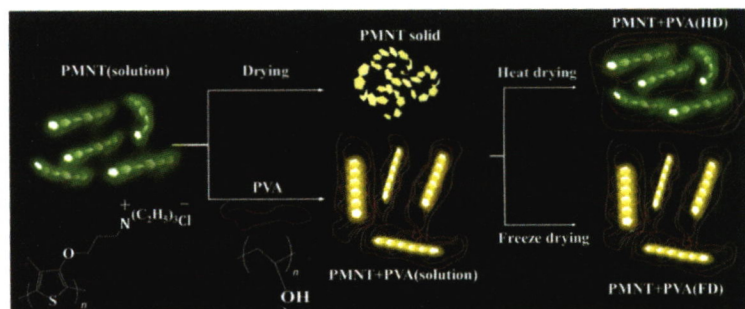


Multi-chambered vesicles were prepared by polymerization-induced self-assembly using styrene (St) as monomer. Morphology degradation of the resultant nano-objects from multi-chambered vesicles to vesicles and then to spherical micelles was observed by introducing solvophilic oligoethylene glycol methyl ether methacrylate (OEGMA) moieties in the core-forming blocks.

Regulating Optical Properties of Water-Soluble Conjugated Polythiophene with Polyvinyl Alcohol

Qi, Zipeng; Gao, Dong; Zhu, Zhicheng; He, Zhiyuan*; Bai, Guoying*

Acta Chim. Sinica **2022**, *80*(7), 921-928

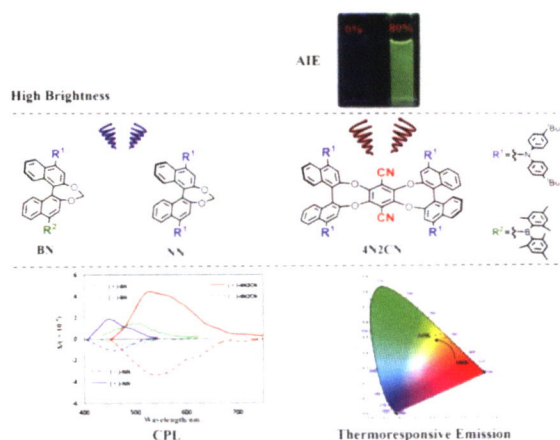


To solve the problem of aggregation-caused quenching of luminescent conjugated polymer dilute solution during drying, this work regulates the aggregation behavior and backbone conformation of a water-soluble conjugated polythiophene (PMNT) in solution with polyvinyl alcohol (PVA) by intermolecular interactions. Further combined with control of dry methods, we obtained PMNT films of tunable light absorption/emission properties.

Synthesis and Properties of Novel Circularly Polarized Luminescence Materials Based on Binaphthol Skeleton

Liu, Bin; Chen, Pangkuan*

Acta Chim. Sinica **2022**, *80*(7), 929-935

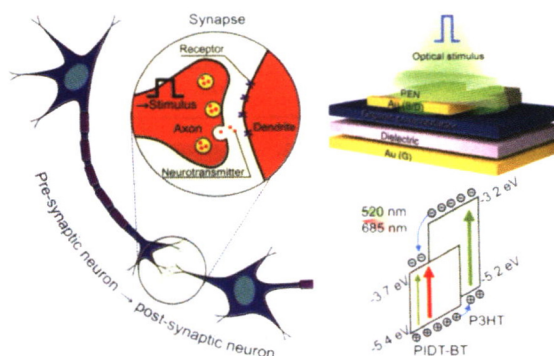


Three examples of new binaphthol-based chiral compounds (BN, NN and 4N2CN) have been designed and synthesized. Compounds BN and 4N2CN exhibit unique temperature response. 4N2CN shows a stronger circular polarized luminescence (CPL) signal than the other two molecules and exhibits aggregation-induced emission (AIE) properties.

High-Performance Flexible Photonic Synapse Transistors Based on a Bulk Composite Film of Organic Semiconductors with Complementary Absorption

Sun, Jiaxian; Liu, Yuting; Yin, Zhigang*; Zheng, Qingdong

Acta Chim. Sinica **2022**, *80*(7), 936-945



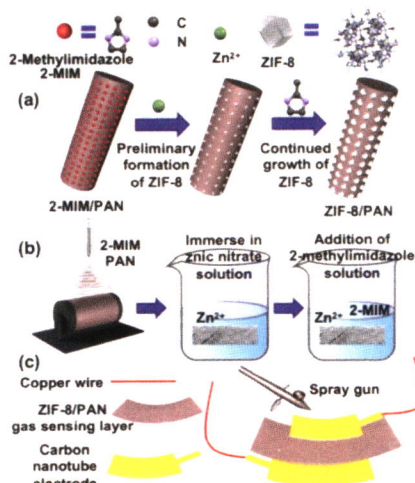
Flexible low-voltage photonic synapse transistors have been developed by using a bulk composite film of poly(3-hexylthiophene) (P3HT) and poly(indacenodithiophene-co-benzothiadiazole) (PIDT-BT) semiconductors with complementary optical absorption as a novel photoactive channel layer. Good synaptic characteristics including the high excitatory postsynaptic current, paired-pulse facilitation, and frequency-dependent properties with the tunable synaptic plasticity are demonstrated for the device. Benefiting from the semiconductor heterostructure of such a PIDT-BT:P3HT film, the response in excitatory postsynaptic current of the device stimulated by two beams with different wavelengths together (520 nm green laser and 685 nm red laser) is much better than the sum of the responses stimulated by each beam alone.

Flexible Acetone Gas Sensor based on ZIF-8/Polyacrylonitrile (PAN) Composite Film

Niu, Ben; Zhai, Zhenyu; Hao, Xiaoke; Ren, Tingli; Li, Congju*

Acta Chim. Sinica **2022**, 80(7), 946-955

Review



Seed embedding method and secondary growth method were used to prepare ZIF-8/polyacrylonitrile (PAN) composite materials, which was used as the flexible gas sensing layer to prepare flexible acetone gas sensor. In addition to the good performance of the conventional acetone sensor, the sensor also has excellent flexibility to keep the sensing performance stable under 180° bending state and 200 times large deformation (180° bending-recovery).

Recent Advances in the Synthesis of Arylstannanes

Yue, Guanglu; Wei, Jingyao; Qiu, Di*; Mo, Fanyang*

Acta Chim. Sinica **2022**, 80(7), 956-969

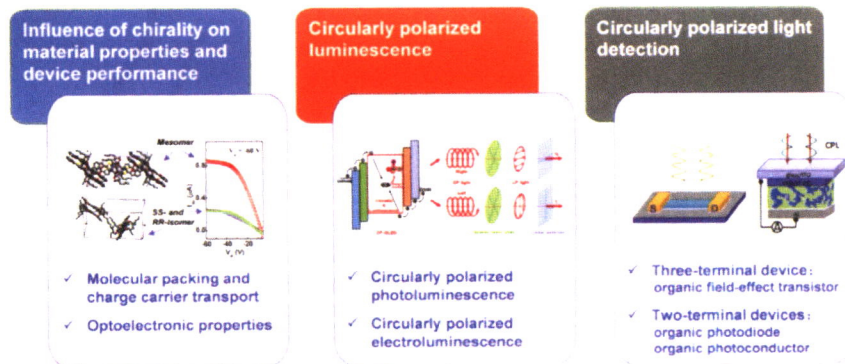


Arylstannanes are highly valuable synthetic intermediates in constructing aryl carbon-carbon bonds and carbon-heteroatom bonds in functional molecules. Due to the synthetic value, development of efficient and novel methods to synthesize arylstannanes is of significant importance. According to the type of reaction mechanism, this content will illustrate the methods for synthesizing arylstannanes in recent years including (1) stannylation of aromatic nucleophiles; (2) stannylation of aromatic electrophiles; (3) transition-metal-catalyzed stannylation coupling reactions; (4) stannylation reactions mediated by aryl radical intermediates; (5) cyclization of alkynes and tandem stannylation.

Chiral Organic Optoelectronic Materials and Circularly Polarized Light Luminescence and Detection

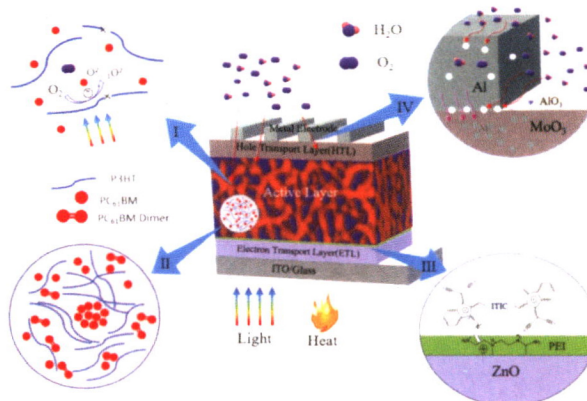
Liu, Lixuan; Yang, Yang; Wei, Zhixiang*

Acta Chim. Sinica **2022**, 80(7), 970-992



The incorporation of chirality into organic semiconducting materials can not only regulate electronic/optoelectronic properties by fine-tuning the aggregation states, but also facilitate the emergence and development of circularly polarized light luminescence and detection.

Research Progress in Degradation Mechanism of Organic Solar Cells

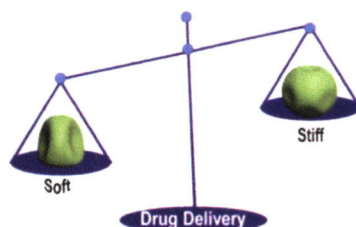


The literature of organic solar cells (OSCs) device degradation in recent years is reviewed and several factors that cause performance degradation in OSCs devices are summarized. Firstly, the device performance attenuation caused by the change of active layer; the photooxidation reaction caused by chemical molecule changes, photochemical reaction, and device aging process; the morphological changes in active layers caused by photothermal stresses and their effects on device performance are introduced. Then the influence of the changes at the interface and transporting layer degradation is introduced. Finally, the multi-directional strategies for improving the stability of OSCs and how to improve the stability of organic solar cells are stated.

Liu, Yanfu; Li, Shilin; Jing, Yanan; Xiao, Linge; Zhou, Huiqiong*

Acta Chim. Sinica **2022**, 80(7), 993-1009

Tuning the Mechanical Properties of Colloid Particles for Drug Delivery

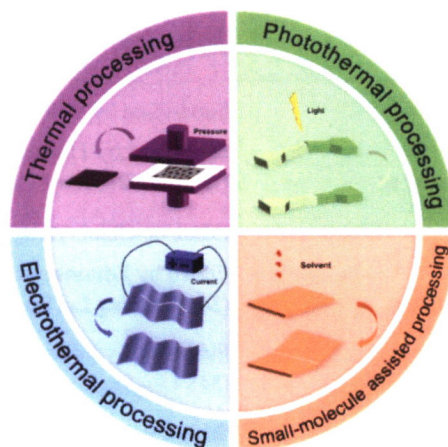


Mechanical properties of colloidal particles play an important role in drug delivery processes, including blood circulation, tumor accumulation and penetration as well as cell internalization.

Gao, Zhiliang; Li, Mengqi; Hao, Jingcheng; Cui, Jiwei*

Acta Chim. Sinica **2022**, 80(7), 1010-1020

Reprocessing of Vitrimers

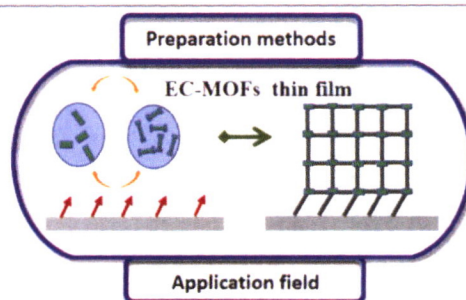


This review is aimed to classify the reprocessing methods of vitrimers, including thermal processing, photothermal processing, electrothermal processing and small-molecule assisted processing. Then, the principle, characteristics and applications of each reprocessing method are summarized, and the development of vitrimer reprocessing is prospected.

He, Enjian; Yao, Yanjin; Zhang, Yubai; Wei, Yen; Ji, Yan*

Acta Chim. Sinica **2022**, 80(7), 1021-1041

Recent Progress of Electric Conductive Metal-Organic Frameworks Thin Film



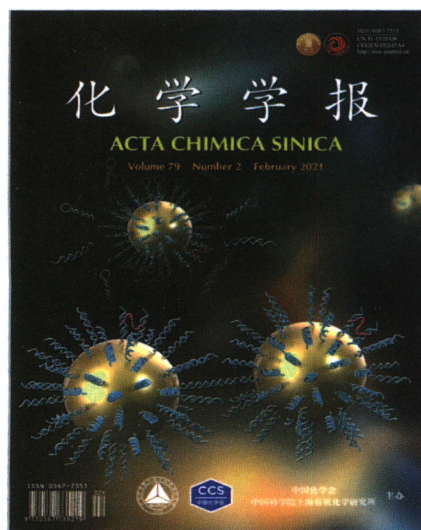
Latest research progress of electrically conductive metal-organic frameworks (EC-MOFs) thin film is summarized including the preparation methods of EC-MOFs thin film and their applications in the field of electricity.

Cao, Linan*; Wei, Min

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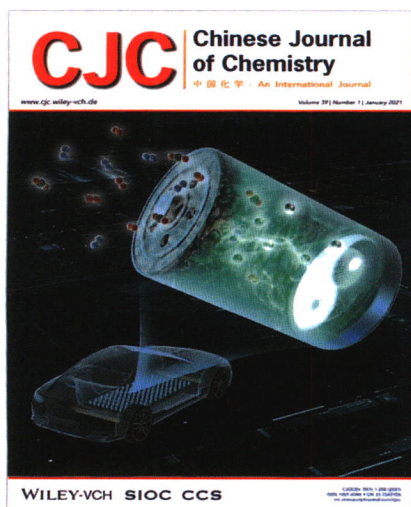
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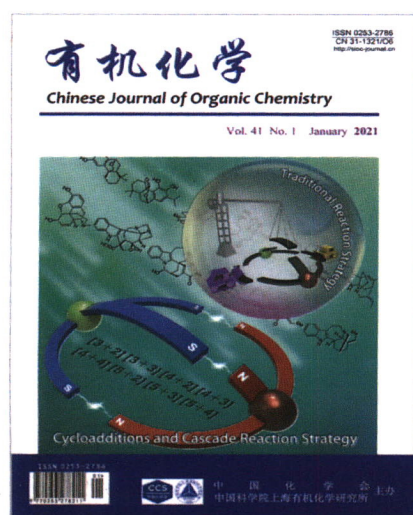
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