

有机化学

Chinese Journal of Organic Chemistry

ISSN 0253-2786

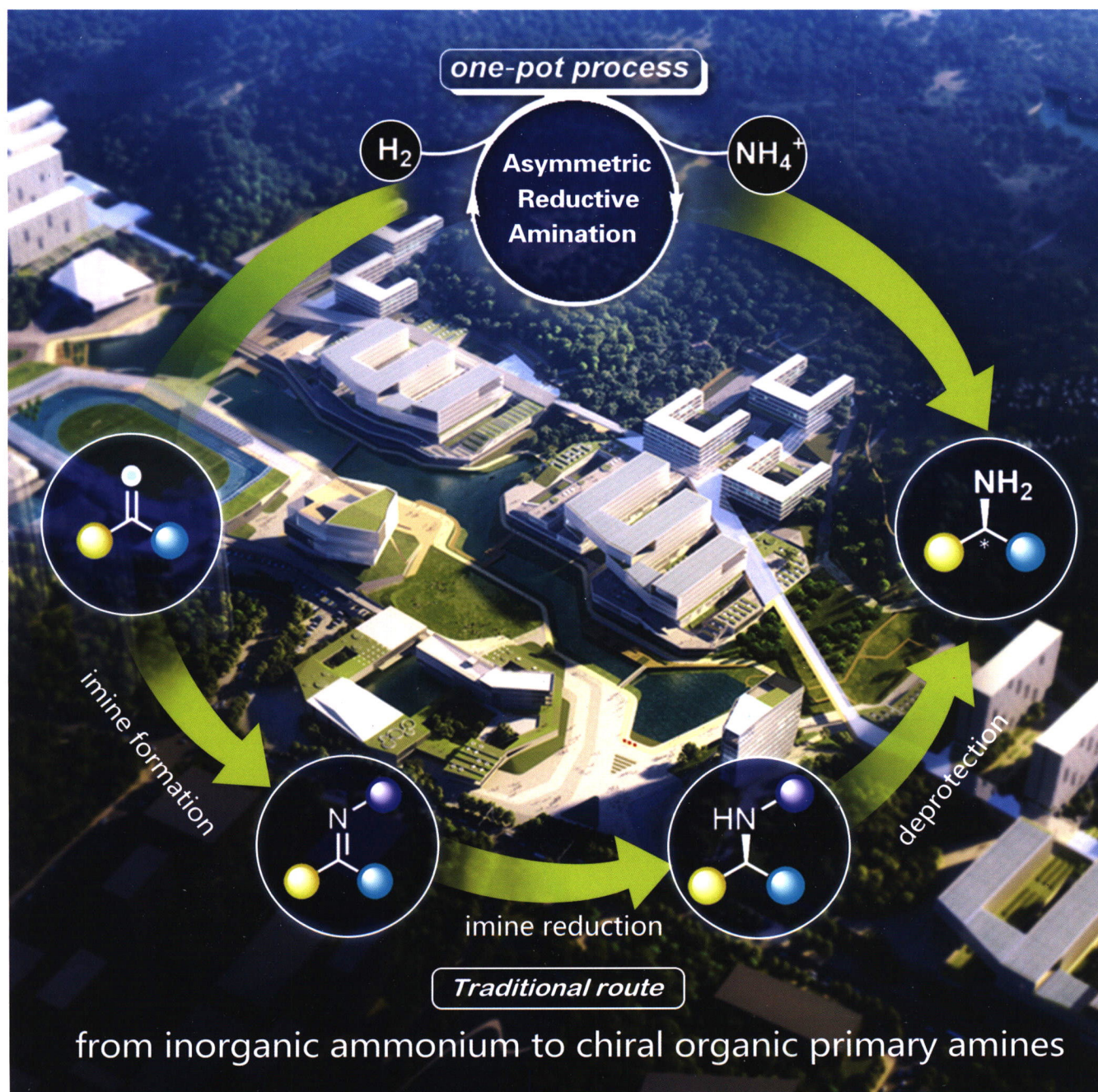
CN 31-1321/O6

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QK2240923

Vol. 42 No. 8 August 2022



from inorganic ammonium to chiral organic primary amines

ISSN 0253-2786



万方数据



中国化学会 主办
中国科学院上海有机化学研究所

有机化学 (月刊)

Chinese Journal of Organic Chemistry

(YOUJI HUAXUE)

第 42 卷 第 8 期 (总 405 期) 2022 年 8 月

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* 通讯联系人.

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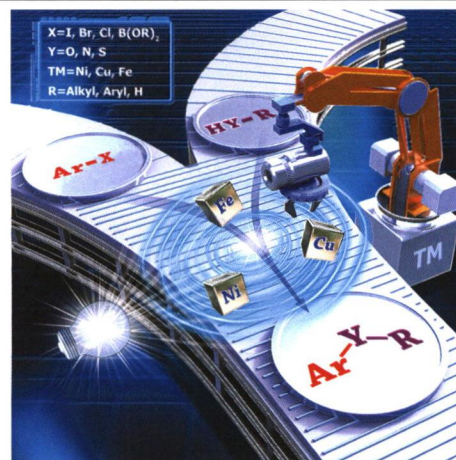
Cover Picture: Advances on Asymmetric Reductive Amination with Ammonium Salts as Amine Sources

α -Chiral primary amine subunits are widespread structural units in a large number of pharmaceutical molecules and are key intermediates toward the preparation of numerous amine-containing drugs. In this account, systematic studies on direct synthesis of chiral primary amines via metal-catalyzed asymmetric reductive amination with cheap ammonium salts as amine sources from Xumu Zhang and Qin Yin's group are summarized on page 2261.



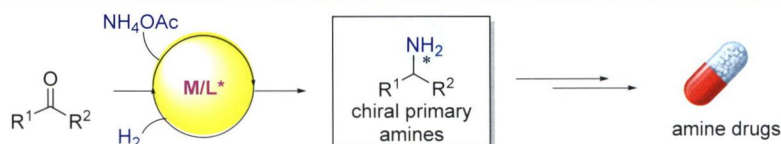
Inside Cover: Research Progress on Light-Promoted Transition Metal-Catalyzed C-Heteroatom Bond Coupling Reactions

The recent progress on light-promoted transition metal-catalyzed C-heteroatom coupling reactions is reviewed with emphasis on its development process and reaction mechanism by Song and Xue on page 2275. The current problems and future development prospects in this field are also summarized and prospected.



ACCOUNT

Advances on Asymmetric Reductive Amination with Ammonium Salts as Amine Sources



Dai, Zengjin; Zhang, Xumu*; Yin, Qin*
Chin. J. Org. Chem. **2022**, 42(8), 2261

The recent progress in metal-catalyzed asymmetric reductive amination of ketones with cost-effective ammonium salts, a method that capable of directly producing synthetically versatile and valuable α -chiral primary amines, has been summarized.

REVIEWS

Research Progress on Light-Promoted Transition Metal-Catalyzed C-Heteroatom Bond Coupling Reactions

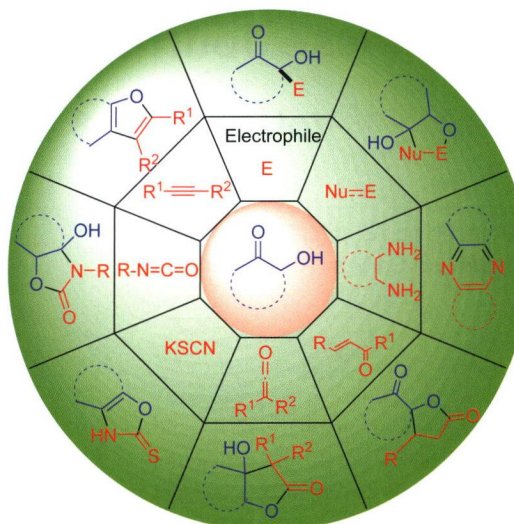


Song, Geyang; Xue, Dong*
Chin. J. Org. Chem. **2022**, 42(8), 2275

The recent progress in the construction of light-promoted transition metal-catalyzed C-heteroatom bonds is summarized. The present issues and prospects of future development in this field are also summarized and forecasted in the end.

CONTENT

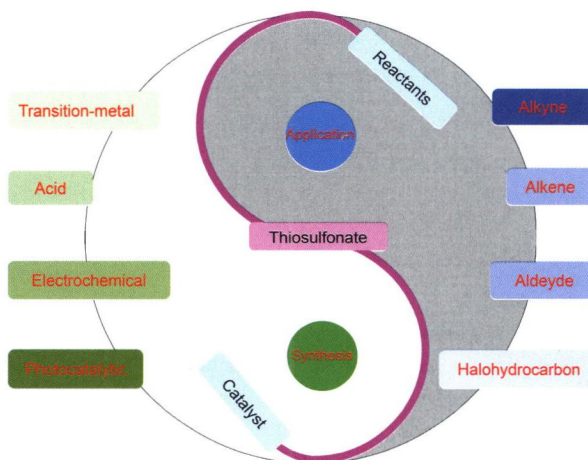
Research Progress of Reactions Participated by α -Hydroxy Ketones



Wang, Junjiao; Lv, Yuyu; Shang, Yongwei; Cui, Zhenli*; Wang, Ke-Hu; Huang, Dan-feng; Hu, Yulai
Chin. J. Org. Chem. **2022**, 42(8), 2300

α -Hydroxyl ketones are employed in the synthesis of various biologically active molecules and drugs. The nucleophilic addition reactions and the cycloaddition reactions involving α -hydroxyl ketones are sorted out and summarized.

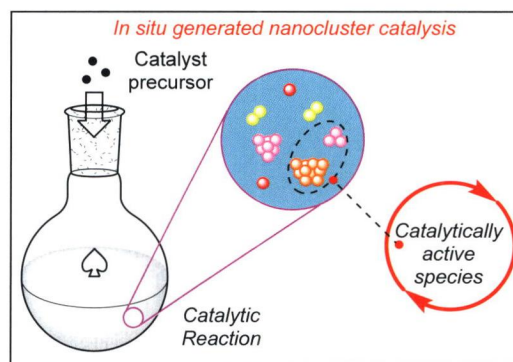
Research Progress in Synthesis and Application of Thiosulfonates



Yu, Shiwei; Chen, Zhaohua; Chen, Qi; Lin, Shuting; He, Jinping; Tao, Guanshen; Wang, Zhaoyang*
Chin. J. Org. Chem. **2022**, 42(8), 2322

According to different types of catalysts and new progress in green chemistry, the synthesis progress of thiosulfonates is summarized. On the other hand, according to the types of reactants and reaction types, the application progress of thiosulfonates in organic synthesis is reviewed, and the future application of thiosulfonates is also prospected.

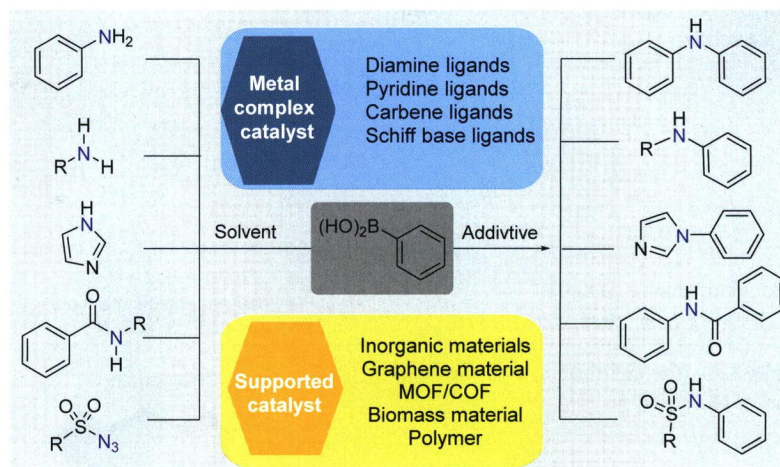
Recent Process in the *in situ* Generated Metal Nanocluster Catalysis



Zhang, Jinyu; Liu, Tianfen; Wang, Le*; Wang, Xiaoming*
Chin. J. Org. Chem. **2022**, 42(8), 2331

Typical examples of the *in situ* generated nanocluster catalysts in synthetic methodologies are reviewed. Their formation from metal complexes or simple metal salts, characterization and effect in catalysis are mainly discussed.

Research Progress of Chan-Lam Coupling Reaction in Heterogeneous Catalysis

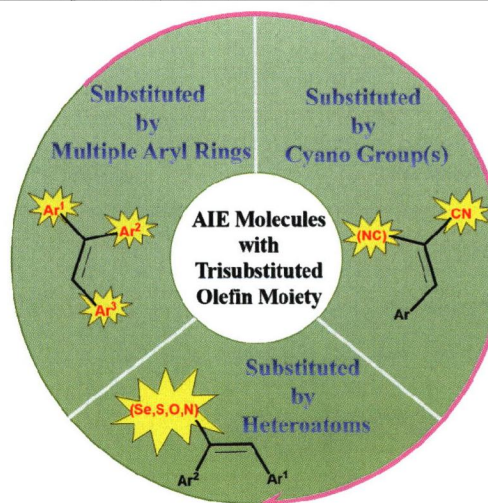


The application of supported and coordinated heterogeneous catalysts in the Chan-Lam coupling reaction under mild and green conditions in recent years is summarized, including the design, synthesis and performance research of catalyst supporters and organic ligands to make readers a better understanding of this interesting field.

Bai, Rui; Liu, Xujuan; Luo, Wenyu; Liu, Shanshan*; Jiao, Linyu*

Chin. J. Org. Chem. **2022**, 42(8), 2342

Design, Synthesis and Application of Tri-substituted Olefinic Aggregation-Induced Emission Molecules

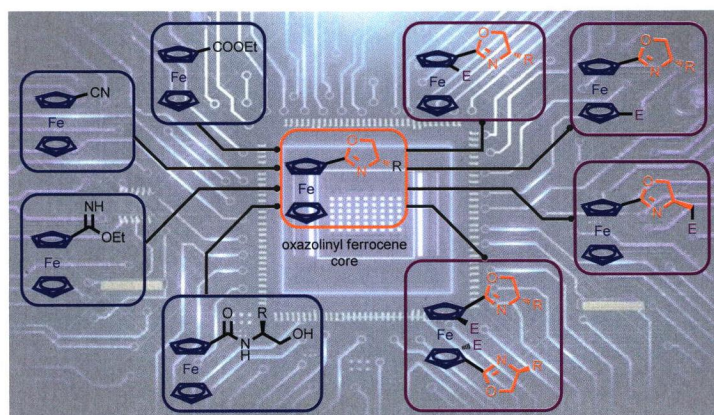


According to the structural characteristics of the substituents attached to the carbon-carbon double bond, these trisubstituted olefinic aggregation-induced emission (AIE) molecules synthesized in recent years are divided into three categories: olefinic AIE molecules substituted (a) by multiple aryl rings, (b) by cyano group(s) and (c) by heteroatoms. As this classification, their molecular mechanisms and applications in the field of organic luminescence materials and fluorescent probes are reviewed, and the future design of the trisubstituted AIE molecules is also prospected.

Chen, Zhaohua; Cao, Xiyang; Chen, Sihong; Yu, Shiwei; Lin, Yanlan; Lin, Shuting; Wang Zhaoyang*

Chin. J. Org. Chem. **2022**, 42(8), 2355

Structures and Synthetic Strategies of Chiral Oxazolinyl Ferrocene Derivatives



The typical derivatives with oxazolinyl ferrocene skeleton are reviewed, and the practical preparation strategies of chiral oxazolinyl ferrocene in recent years are reviewed. The potential challenges and further applications in the field of oxazolinyl ferrocene derivatives are also prospected.

Dai, Li; Xu, Di*; Mao, Yifei; Zhu, Jiaqi; Yang, Mengjiao

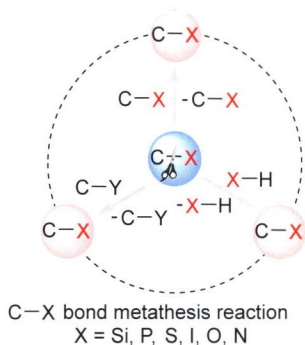
Chin. J. Org. Chem. **2022**, 42(8), 2364

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Recent Advances in C—X Bond Metathesis Reactions

Yu, Bangkui; Huang, Hanmin*

Chin. J. Org. Chem. **2022**, 42(8), 2376

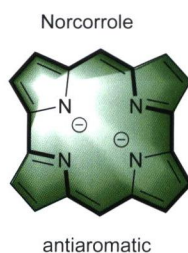


The progress of C—Si, C—P, C—S, C—I, C—O and C—N bonds metathesis reactions and their applications in organic synthesis are summarized according to the type of bonding.

Progress in the Synthesis and Derivatization of Norcorrole

Li, Sha; Sun, Yahan; Meng, Yankui; Li, Xiaofang*; Zhang, Shaowei*

Chin. J. Org. Chem. **2022**, 42(8), 2390



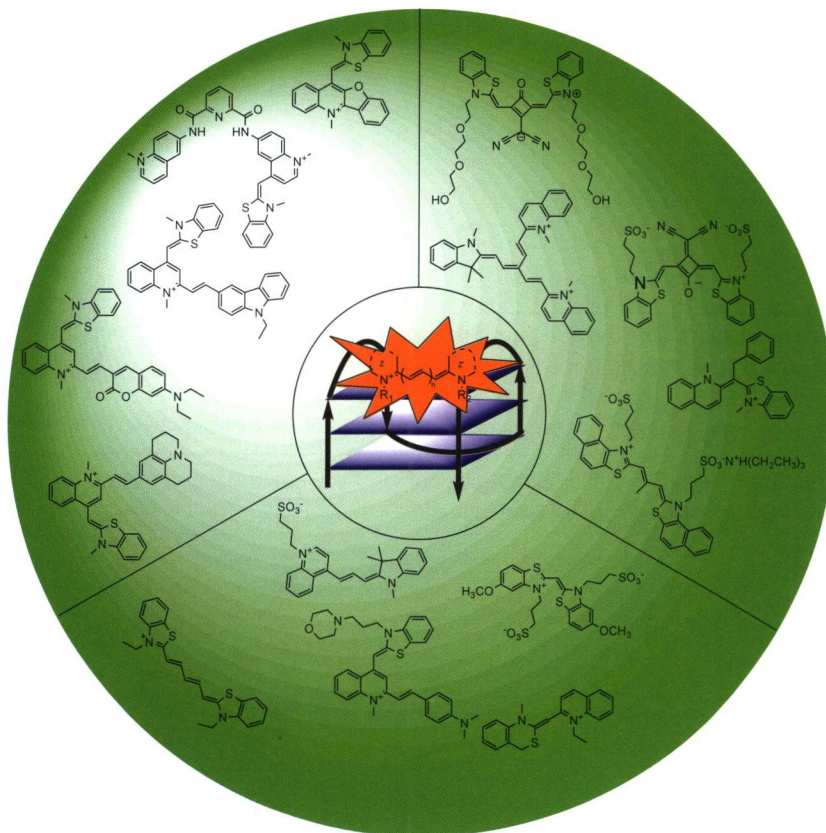
Distinct paratropic ring current
High single molecule conductivity
Narrow HOMO-LUMO gap
Stable redox performance
Unique chemical reactivity

The different synthetic methods of norcorrole in recent years are reviewed, with emphasis on the derivatization reactions in four aspects: insertion, substitution, redox and extension of π conjugated system, and the development of norcorrole is prospected.

Research Progress in Cyanine-Based Recognition Probes for G-Quadruplex DNA

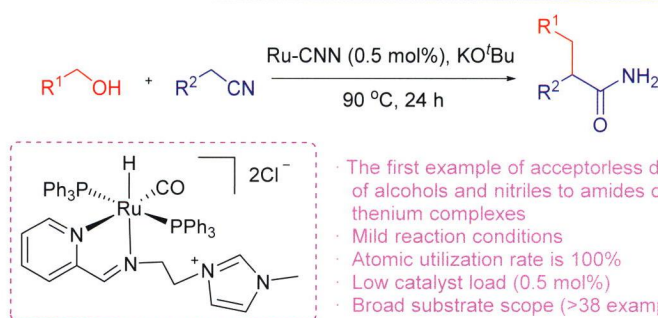
Guan, Li*; Mao, Yongbao; Zhou, Yanyan; Feng, Xiaowen; Fu, Yile

Chin. J. Org. Chem. **2022**, 42(8), 2406



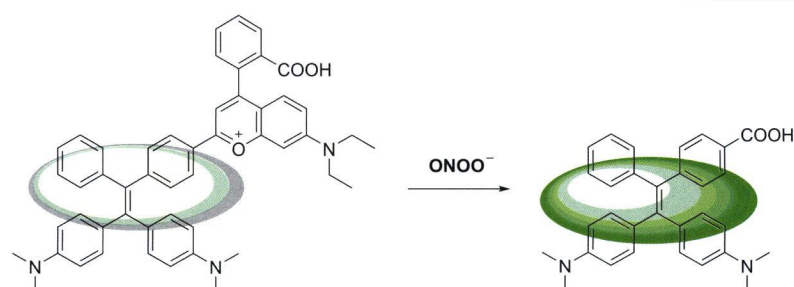
The research progresses in the field of G-quadruplex recognition probes based on cyanine dye are reviewed. Molecular design and properties of this kind of probes are briefly introduced, the affinity and selectivity of probes for G-quadruplex DNA are also commented. Moreover, the future trends of cyanine-based recognition probes for G-quadruplex are briefly introduced.

ARTICLES

Ruthenium Complex-Catalyzed Tandem
Reactions of Alcohols with Acetonitriles
for Synthesis of α -Substituted Amides

Wang, Mei; Gong, Huihua; Fu, Haiyan;
Zheng, Xueli; Chen, Hua; Li, Ruixiang*
Chin. J. Org. Chem. **2022**, 42(8), 2418

A ruthenium complex-catalyzed tandem reaction of alcohols with nitriles in one pot has been developed, providing a green and atom-economic synthetic method of α -substituted amide.

Construction and Cell Imaging Study of a
Novel Fluorescent Probe for $ONOO^-$
Detection

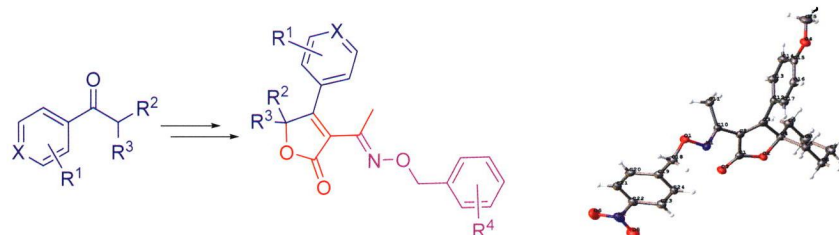
Li, Jiaxin; He, Ruyan; Duan, Senlin; Li,
Jinhua; Han, Xiaojing; Ye, Yong*
Chin. J. Org. Chem. **2022**, 42(8), 2428

A novel $ONOO^-$ fluorescent probe TPE- $ONOO$ was successfully constructed using tetraphenylethylene as a fluorophore and a pyrylium group as the specific recognition site of $ONOO^-$. The probe showed high selectivity, strong anti-interference ability and high sensitivity to $ONOO^-$. Cell assays suggested that the probe has low cytotoxicity and was successfully used for imaging monitoring of exogenous and endogenous $ONOO^-$ in cells.

Trifluoromethyl Sulfonic Anhydride Me-
diated Addition of Pyridine with Ynamides

Song, Haoru; Sun, Jianting; Lü, Min; Liu,
Yiwen*; Wei, Bangguo*
Chin. J. Org. Chem. **2022**, 42(8), 2433

A convenient approach to pyridine quaternary ammonium salts containing enamine fragment has been developed, which features a trifluoromethyl sulfonic anhydride mediated regioselective addition process of pyridine with ynamides. Using this method, a variety of substituted pyridine quaternary ammonium salts containing enamine fragment $3a \sim 3m$ were prepared in moderate to excellent yields with high regioselectivities ($Z:E$ up to 20:1).

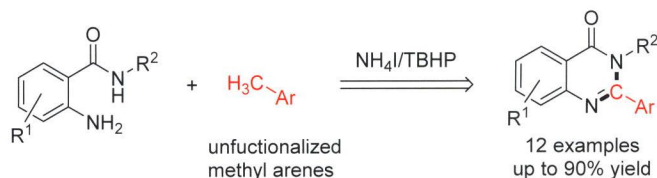
Synthesis and Fungicidal Activity of No-
vel Butenolide Compounds Containing
Oxime Ether Moiety

Zhang, Qian; Li, Yihao; Xu, Leichuan; Ma,
Haoyun; Li, Xiangdong*; Wang, Ming'an*
Chin. J. Org. Chem. **2022**, 42(8), 2438

A series of novel butenolide compounds containing oxime ether were designed and synthesized through diversity modification of the benzene ring at 4-phenyl and the 3-oxime ether group of 3-acetyl-4-phenyl-1-oxaspiro[4,5]dec-3-en-2-one oxime ether. Their fungicidal activities were evaluated.

CONTENT

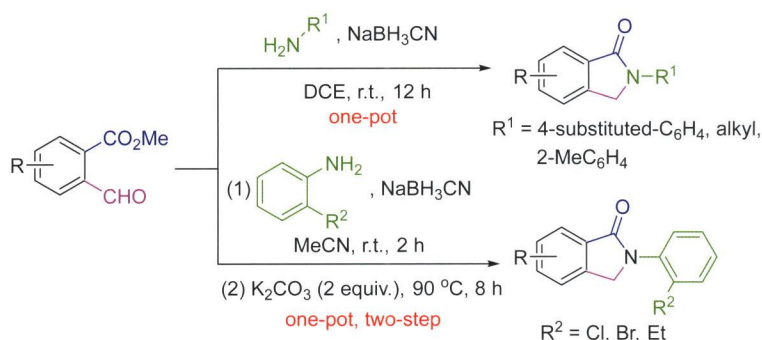
Synthesis of Quinazolin-4(3*H*)-ones via Ammonium Iodide-Catalyzed Dual Amination of sp^3 C—H Bonds



Yu, Xiaoxiao; Bai, Wangheng; Zhu, Jianye; Zhang, Yuting; Zhang, Mengru; Wu, Jiwei*
Chin. J. Org. Chem. **2022**, 42(8), 2449

A novel method for synthesizing quinazoline-4(3*H*)-ones was developed by using inexpensive ammonium iodide as catalyst via dual amination of aromatic benzylic position sp^3 C—H bonds.

One-Pot Synthesis of *N*-Substituted Isoindolin-1-ones via Reductive Amination/Lactamization of Methyl 2-Formylbenzoate



Zhang, Wensheng*; Li, Yan; Cui, Haiyan; Su, Xiaoli; Xu, Supeng*
Chin. J. Org. Chem. **2022**, 42(8), 2456

A one-pot reaction involving aminative reduction and lactamisation of methyl 2-formylbenzoate with diverse amines was investigated. The reaction occurs to produce *N*-substituted isoindolin-1-ones in satisfactory yields.

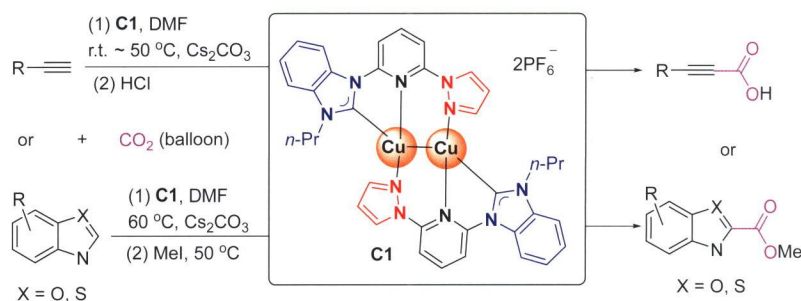
Visible-Light-Induced Denitrification Oxygenation Reaction of α -Diazoesters to Construct α -Oxyimido Esters



Liu, Ruisheng; Fu, Shuangmin; Chu, Xiumin; Zhang, Lingli; Ding, Rou; Zhao, Xian'en; Yue, Huilan*; Wei, Wei*
Chin. J. Org. Chem. **2022**, 42(8), 2462

A visible-light-induced method for the synthesis of α -oxyimido esters via denitrification oxygenation reaction of α -diazoesters with *N*-hydroxyimides has been described. This reaction provides an efficient approach to synthesize a series of *N*-hydroxyimides at room temperature in 1,4-dioxane under irradiation of 3W blue LED lamps without any photocatalyst.

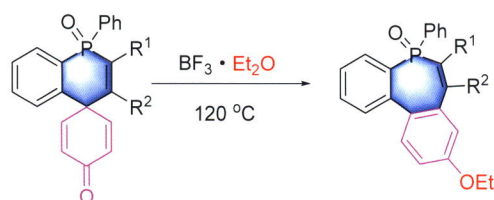
CNN-Type Binuclear Cu(I) Complexes Catalyzed Direct Carboxylation via the Fixation of CO_2 at Room Temperature



Chen, Fei; Tao, Sheng; Liu, Ning*; Dai, Bin*
Chin. J. Org. Chem. **2022**, 42(8), 2471

The binuclear Cu(I) complexes catalyzed direct carboxylation of the terminal alkynes was developed. The Cu(I) catalytic system showed high catalytic activity and good tolerance toward a wide range of functional groups for the terminal alkynes or heteroarenes under relatively mild conditions.

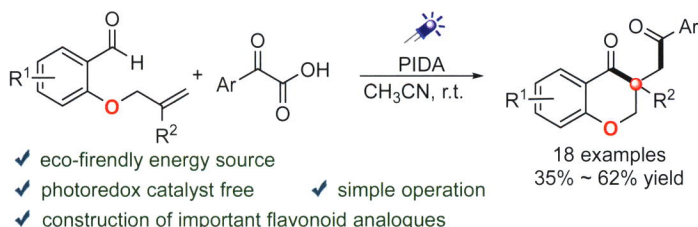
BF₃•Et₂O Promoted Dienone-Phenol Type Rearrangement to Synthesize Phosphepine with Aggregation Induced Luminescence (AIE) Effect



A novel synthetic route for phosphepines from spiro six-membered phosphacycles in the presence of BF₃•Et₂O was developed. The obtained phosphepines show aggregation-induced luminescence (AIE) effects and their photophysical properties were investigated.

Guo, Ze; Wu, Di; Wang, Lili*; Duan, Zheng*
Chin. J. Org. Chem. **2022**, 42(8), 2481

Visible Light-Induced 4-Chromanones Synthesis: Radical Cascade Cyclization of α -Oxocarboxylic Acids with *o*-(Allyloxy)arylaldehydes Promoted by Phenyl-iodine(III) Diacetate



Zhou, Xuyu; Zhang, Aijun; Zhang, Qing-qing; Liu, Qing'an*; Xuan, Ju*
Chin. J. Org. Chem. **2022**, 42(8), 2488

An efficient catalyst free, visible light-promoted cascade radical cyclization of α -oxocarboxylic acids with *o*-(allyloxy)arylaldehydes towards the construction of 1,4-diketone containing chromanone derivatives was reported.

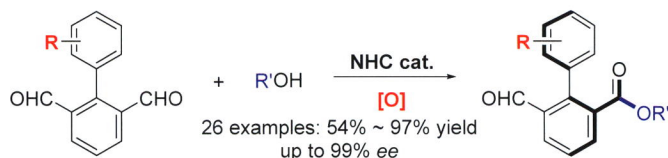
***N*-Iodosuccinimide (NIS) Promoted Synthesis of 3-Substituted Indole Derivatives**



A catalytic procedure for Michael addition reaction of indole or its derivatives with α,β -unsaturated ketones catalyzed by *N*-halosuccinimide has been successfully developed. The optimal condition of this reaction employs 10 mol% *N*-iodosuccinimide (NIS) as catalyst, CH₃CN as solvent, room temperature as reaction temperature and 18 h as reaction time.

Qian, Cunwei*; Han, Rong; Shen, Zhixing; Li, Qian; Chen, Xuanrong*
Chin. J. Org. Chem. **2022**, 42(8), 2496

***N*-Heterocyclic Carbene (NHC)-Catalyzed Desymmetrization of Biaryldialdehydes to Construct Axially Chiral Aldehydes**



An *N*-heterocyclic carbene (NHC)-catalyzed oxidative esterification of biaryldialdehydes through desymmetrization strategy was disclosed. A range of axially chiral aldehydes were produced in generally good yields and high enantioselectivity under mild conditions.

Zhao, Wei; Liu, Jing; He, Xiangkui; Jiang, Hao; Lu, Liangqiu*; Xiao, Wenjing*
Chin. J. Org. Chem. **2022**, 42(8), 2504

Nickel-Catalyzed Stereoselective Aryl-Difluoroalkylation of Alkynes

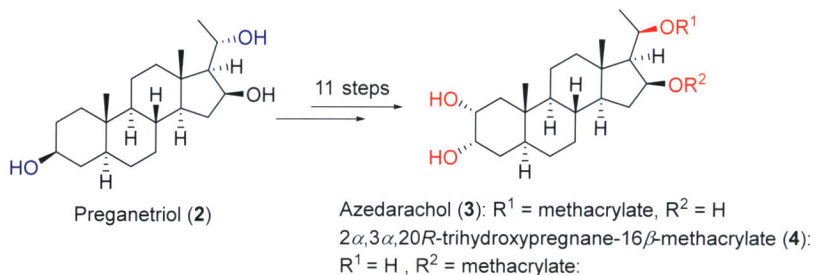


Sun, Qi; Sun, Zeyang; Yu, Ze; Wang, Guangwei*
Chin. J. Org. Chem. **2022**, 42(8), 2515

Nickel-catalyzed aryl-difluoroalkylation of alkynes was presented, and a series of tri-substituted fluorine-containing alkenes can be obtained in a highly stereoselective manner.

CONTENT

Synthesis of Azedarachol and 2 α ,3 α ,20 R -Trihydroxypregnane-16 β -methacrylate



The synthesis of azedarachol (3) and 2 α ,3 α ,20 R -trihydroxypregnane-16 β -methacrylate (4) in 11 steps from preganetriol (2) is reported. This synthesis features a intramolecular S_N2 reaction enabled stereoselective installation at C(20), substrate-controlled dihydroxylation at C(2)—C(3).

Gao, Ran*; Tian, Weisheng*
Chin. J. Org. Chem. **2022**, 42(8), 2521

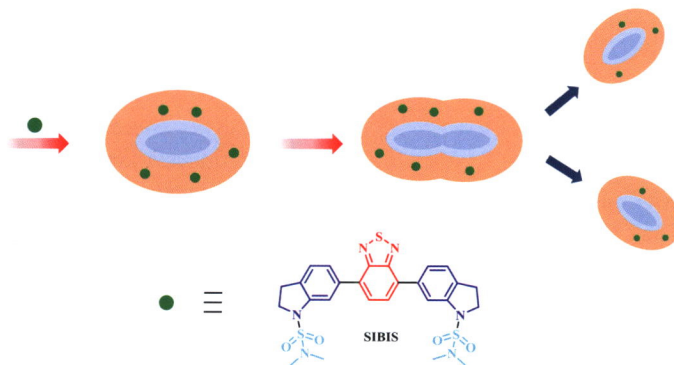
Direct Synthesis of 3-Sulfonylquinolines from *N*-Propargylanilines with Sulfonyl Chlorides



Wang, Keli; Huang, Jing; Liu, Wei; Wu, Zhilin; Yu, Xianying; Jiang, Jun*; He, Weimin*
Chin. J. Org. Chem. **2022**, 42(8), 2527

3-Sulfonylquinolines broadly exist in various bioactive molecules and synthetic pharmaceuticals. An efficient and facile one-pot method for synthesizing various 3-sulfonylquinolines from *N*-propargylanilines and sulfonyl chlorides is reported. This procedure not only can be performed on a gram scale but also be applicable to prepare marketed pharmaceutical derivative

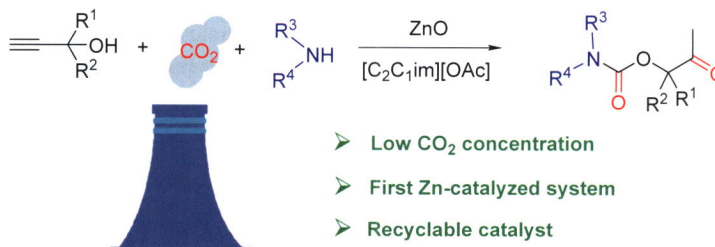
Synthesis of A Sulfonamide-Substituted Benzothiadiazole-Based Fluorescent Dye and Study of Its Application for Long-Term Cancer Cell Tracking



Xia, Weikang; Liu, Chuang; Ye, Sheng; Wang, Lei*; Liu, Ruiyuan*
Chin. J. Org. Chem. **2022**, 42(8), 2535

A sulfonamide-substituted benzothiadiazole-based fluorescent dye (SIBIS) was designed and synthesized for long-term cancer cell tracking.

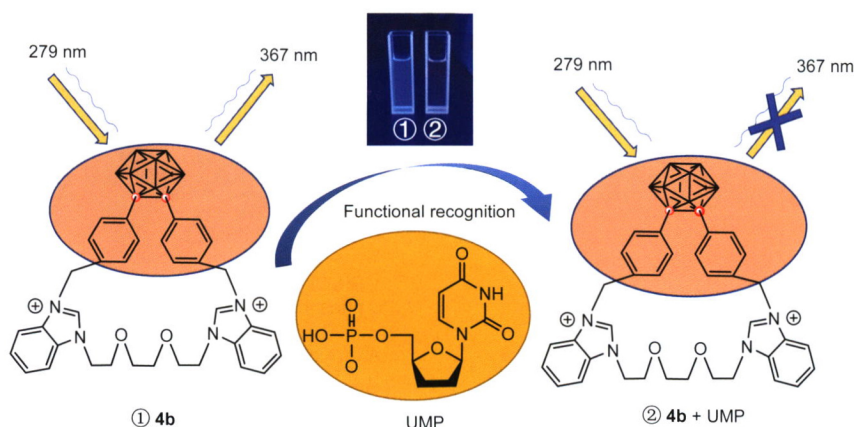
Synthesis of β -Oxopropylcarbamates Catalyzed by ZnO/Ionic Liquids under Atmospheric CO₂



Xu, Yong; Zhang, Yongxing; Hu, Jia; Chen, Cheng; Yuan, Ye*; Verpoort, Francis*
Chin. J. Org. Chem. **2022**, 42(8), 2542

A method was developed for the synthesis of various β -oxopropylcarbamates using the ZnO/ionic liquid system to catalyze the three-component coupling reaction of atmospheric carbon dioxide, secondary amines and propargyl alcohol.

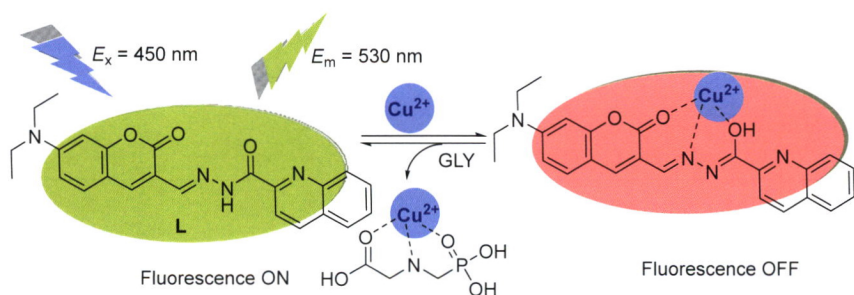
Synthesis and Nucleotide Recognition Properties of Carborane-Based Benzimidazolium Cyclophane



Two novel carborane-based benzimidazoliums **4a** and **4b** have been designed and synthesized. The interactions of these probes with UMP by fluorescence absorption, UV/Vis, and ^1H NMR spectroscopy were studied. The fluorescence titration results showed that the probes **4a** and **4b** could significantly quench the fluorescence of UMP. Anti-interference experiments confirmed the potential of probe **4b** to selectively recognize UMP.

Lin, Binghan; Zhuo, Jibin; Lin, Caixia; Gao, Yong*; Yuan, Yaofeng*
Chin. J. Org. Chem. **2022**, 42(8), 2551

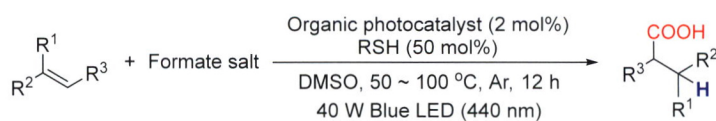
A Novel Quinoline Hydrazone-Based Fluorescent Probe for Sequential Determination of Cu^{2+} /Glyphosate and Its Applications



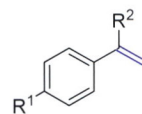
A novel fluorescent probe **L** based on quinoline hydrazone have been designed and synthesized. The probe **L** could relay recognition of Cu^{2+} and glyphosate. Moreover, complex **L**- Cu^{2+} was used for the visual detection of glyphosate based on color change and applied to the detection of glyphosate in the actual water samples.

Wu, Mianyuan; You, Jun*; Yu, Yanchao*; Wu, Wenju
Chin. J. Org. Chem. **2022**, 42(8), 2559

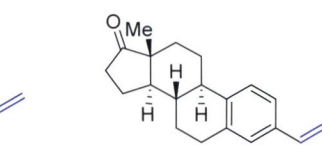
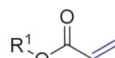
Hydrocarboxylation of Alkenes with Formate Salts via Photocatalysis



Broad substrate scope



R^1 = donating/withdrawing group
 R^2 = H, Alkyl, Ar'



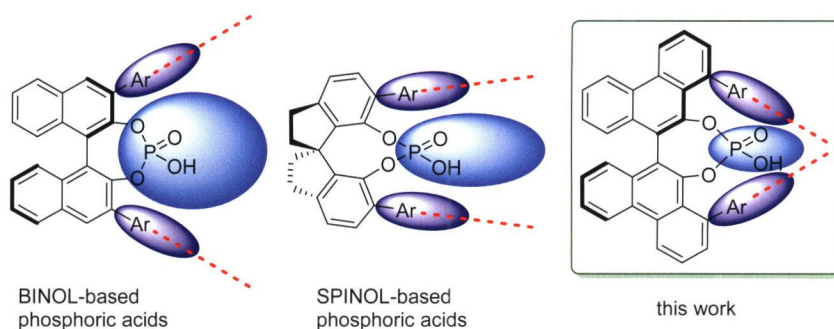
A series of biologically active molecule

A transition-metal-free β -selective hydrocarboxylation of alkenes under mild conditions has been developed using a formate salt as the reductant, carbonyl source. A broad range of alkenes were compatible with this method and can be efficiently converted into value-added carboxylic acid products. This method also features low catalyst loading, good functional group tolerance, and easy scalability.

Huang, Yan; Zhang, Qian; Zhan, Lewu; Hou, Jing*; Li, Bindong*
Chin. J. Org. Chem. **2022**, 42(8), 2568

CONTENT

Synthesis of Biphenanthrol-Based Confined Chiral Phosphoric Acid

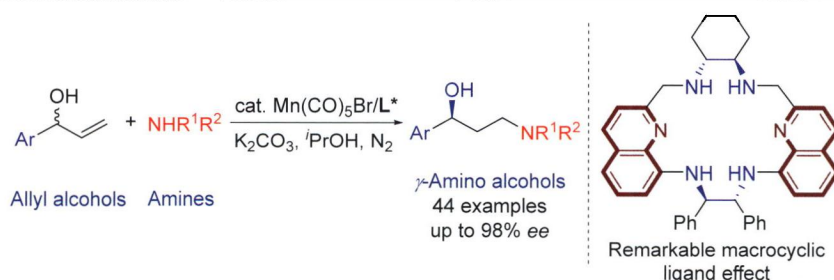


A novel biphenanthrol-based confined phosphoric acid was designed, synthesized and characterized by single crystal X-ray diffraction analysis. By introducing two aromatic substituents which extend inwardly onto the 1,1'-positions of the 9,9'-biphenanthryl-10,10'-diol (BIFOL) backbone, a compacted chiral environment was created around the phosphoric acid unit.

Cen, Shouyi; Zhang, Zhipeng*
Chin. J. Org. Chem. **2022**, 42(8), 2574

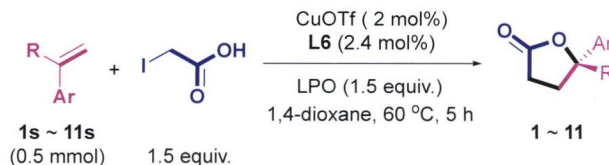
HIGHLIGHTS

Manganese-Catalyzed Asymmetric Formal Hydroamination of Allylic Alcohols Enabled by a Remarkable Macrocyclic Ligand Effect



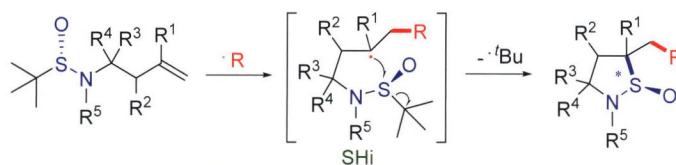
Liu, Chenguang; Wang, Yujie; Liu, Qiang*
Chin. J. Org. Chem. **2022**, 42(8), 2582

Copper-Catalyzed Radical Enantioselective Carbo-esterification of Styrenes Enabled by a Perfluoroalkylated-PyBox Ligand



Zhou, Huan; Liu, Xin-Yuan*
Chin. J. Org. Chem. **2022**, 42(8), 2584

Radical-Mediated Stereospecific Homolytic Substitution of Sulfinamides Access to Asymmetric Cyclization of Alkenes



Xu, Xinming; Sun, Kai*
Chin. J. Org. Chem. **2022**, 42(8), 2587

Visible-Light-Induced Radical Arylation Reactions via Electron Donor-Acceptor Complex



Yi, Rongnan; He, Weimin*
Chin. J. Org. Chem. **2022**, 42(8), 2590

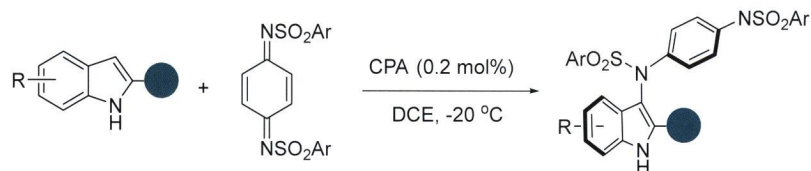
Photoredox Catalytic Radical Fluorosulfonylation of Olefins



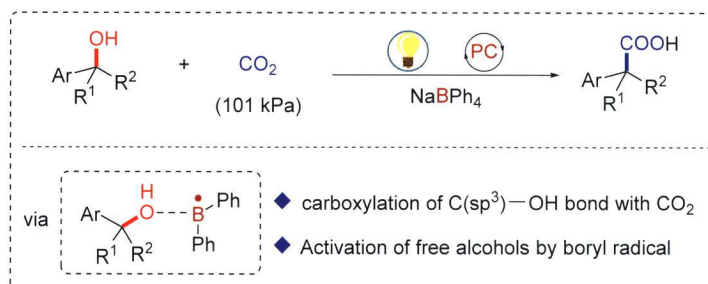
Lin, Jinhong; Xiao, Jichang*
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Asymmetric Synthesis of Indolyl C—N
Atropoisomers through Enantioselective
Electrophilic Amination

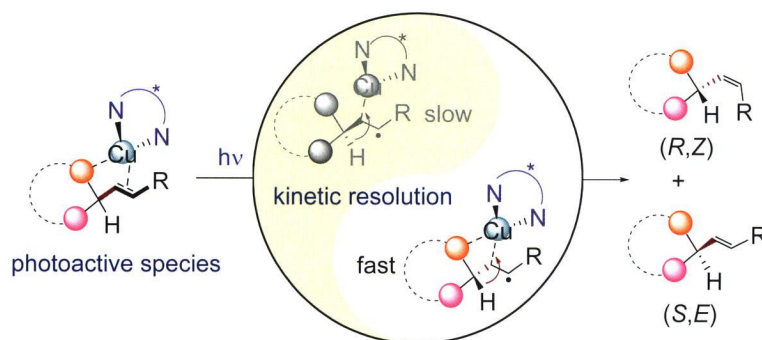
Liu, Wei; Yang, Xiaoyu*

Chin. J. Org. Chem. **2022**, 42(8), 2596Boryl Radical-Promoted Carboxylation of
Benzylic C—OH Bonds

Zhou, Wenjun; Ran, Chuankun; Yu, Dagang*

Chin. J. Org. Chem. **2022**, 42(8), 2599Kinetic Resolution through Olefin *E*→*Z*
Isomerization Mediated by Excited Chiral
Copper Complexes

Ye, Ziqi; Gong, Lei*

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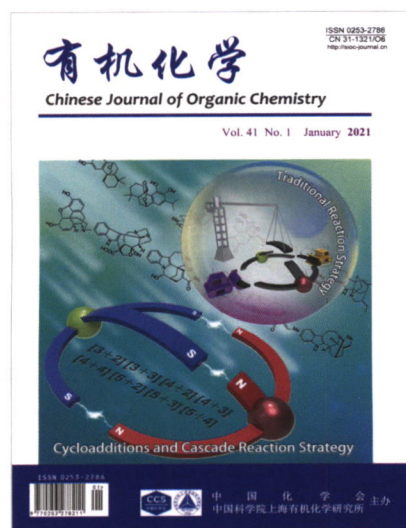
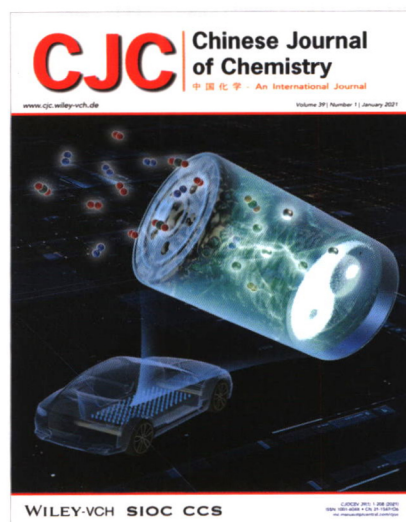
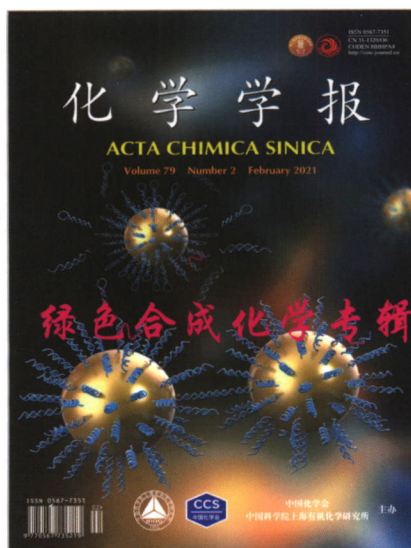
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国际刊号: ISSN 0253-2786

国内刊号: CN 31-1321/O6

国内邮发代码: 4-285

国外发行代码: M 513

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