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Chinese Journal of Organic Chemistry

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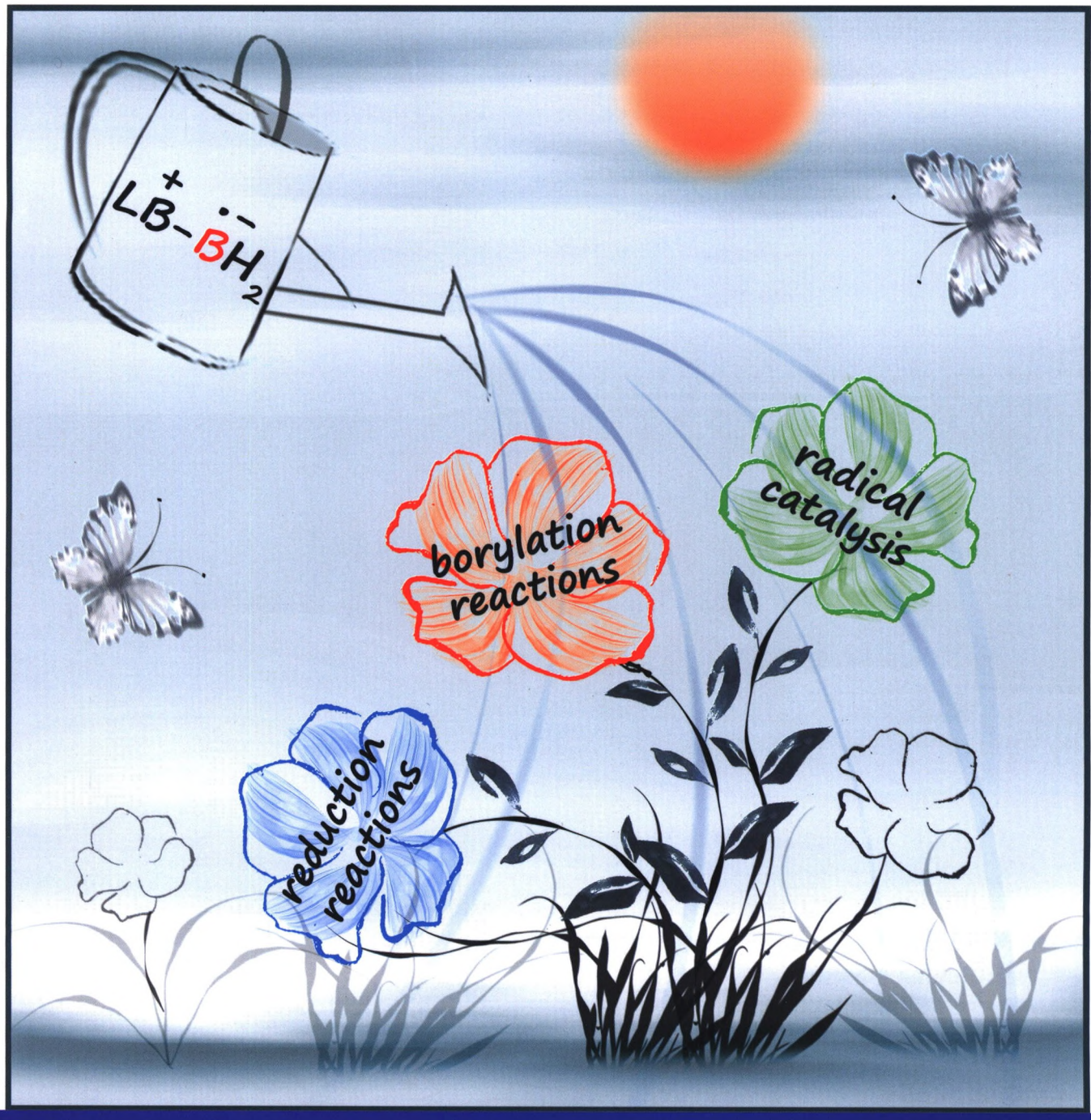

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中国科学院上海有机化学研究所 主办

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(YOUJI HUAXUE)

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研究专题

综述与进展

研究论文

* 通讯联系人.

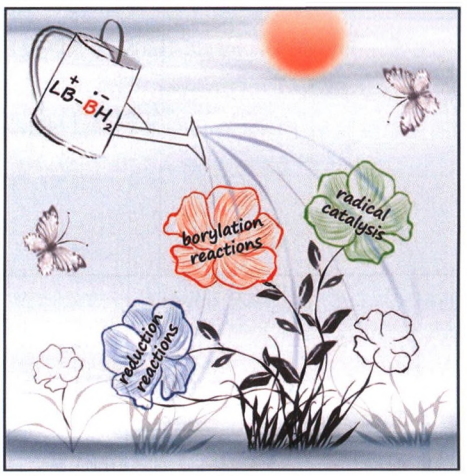
研究简报

亮点述评

Chinese Journal of Organic Chemistry

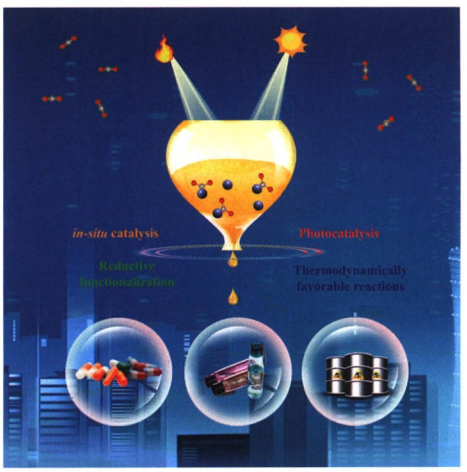
Vol. 40 No. 8 August 2020

Cover Picture: Lewis-Base Boryl Radicals Enabled Borylation, Radical Catalysis and Reduction Reactions



Lewis-base boryl radicals have recently received increasing attention in synthetic chemistry because of their unique chemical reactivity. The research progress on synthetic applications of Lewis base-boryl radicals in borylation reactions, radical catalysis, and reduction reactions is summarized. This paper is reported by Jin, Xia, Zhang, and Wang on page 2185.

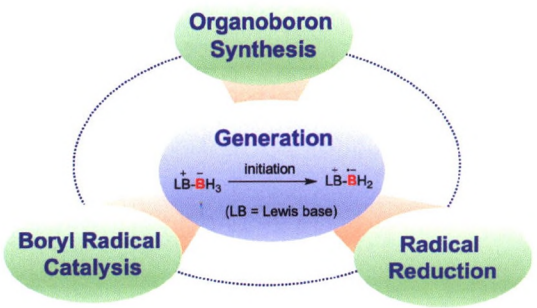
Inside Cover: Advance and Prospective on CO_2 Activation and Transformation Strategy



Carbon dioxide valorization into valuable chemicals is a promising approach to release environmental and energy issues. Recent efforts to design novel strategies including carbon dioxide capture and *in-situ* transformation, reductive functionalization of carbon dioxide, multi-component cascade reaction, photo-promoted carbon dioxide transformation and so on for carbon dioxide activation and transformation by Liangnian He's group are highlighted on page 2195.

ACCOUNT

Lewis-Base Boryl Radicals Enabled Borylation, Radical Catalysis and Reduction Reactions



Jin, Jikang; Xia, Huimin; Zhang, Fenglian; Wang, Yifeng*

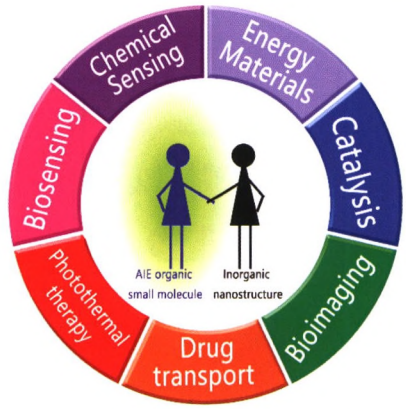
Chin. J. Org. Chem. **2020**, *40*(8), 2185

This account summarizes our new findings in this research field, including Lewis-based boryl radicals enabled borylation reactions, Lewis-based boryl radicals-catalyzed new reactions, and Lewis-based boryl radicals promoted reduction reactions. These reactions feature mild reaction conditions, good functional groups compatibility, high yields, and excellent chemo-, regio-, and stereo-selectivities.

CONTENT

REVIEWS

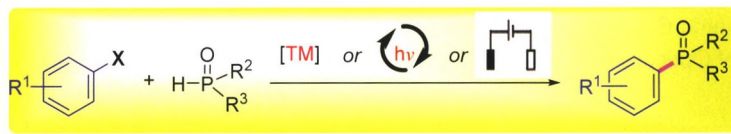
Recent Progress in Aggregation-Induced Emission-Active Organic Small Molecule Inorganic Nanocomposites



Gao, Ying; Qin, Chengyuan; Nie, Yong*; Liu, Wei; Li, Tianrui; Jiang, Xuchuan*
Chin. J. Org. Chem. **2020**, *40*(8), 2254

The recent progress in the organic-inorganic composites of aggregation-induced emission (AIE)-active organic small molecules and various types of inorganic nanostructures is reviewed. The typical applications of these composites in chemical sensing, biosensing, bioimaging, drug transport, catalysis, photothermal therapy and energy materials are summarized. The prospects of the future research are also discussed.

Progress in the Synthesis of Arylphosphonates via Ar—P Bond Construction

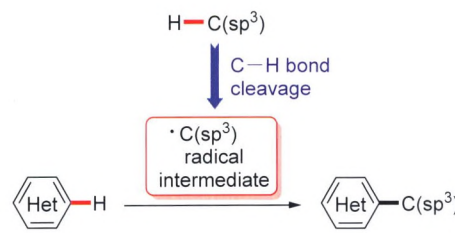


X = Cl, Br, I, N, O, S, C, H, Bi, Si, *etc.*
R^2, R^3 = alkyl, aryl, alkoxyl

Sun, Kai; Liu, Haidong; Xie, Qi; Luo, Haiqing*
Chin. J. Org. Chem. **2020**, *40*(8), 2275

On basis of various aryl sources for the Ar—P bond construction, the recent advances in the development of the synthesis of arylphosphonates catalyzed by transition metals and photoinduced are surveyed.

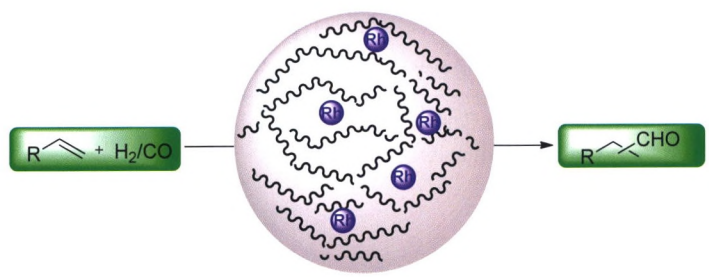
Recent Progress in Radical Alkylation of Heteroarenes Based on C(sp^3)—H bond Cleavage Strategy



Luo, Wenkun; Yang, Kai*; Yin, Biaolin*
Chin. J. Org. Chem. **2020**, *40*(8), 2290

C(sp^3)—H bond cleavage strategy was widely used in radical alkylation of heteroarenes in organic synthesis and has been successfully applied in the total synthesis of natural products and pharmaceuticals due to its excellent atom economy. Based on the different precursor compounds (ethers, alcohols, amines, esters, amides and common alkanes), the research progress of radical alkylation of heteroarenes in a decade is summarized, and the related mechanism is also discussed.

Progress in Application of Organic Polymers Supported Rhodium Catalysts in Hydroformylation



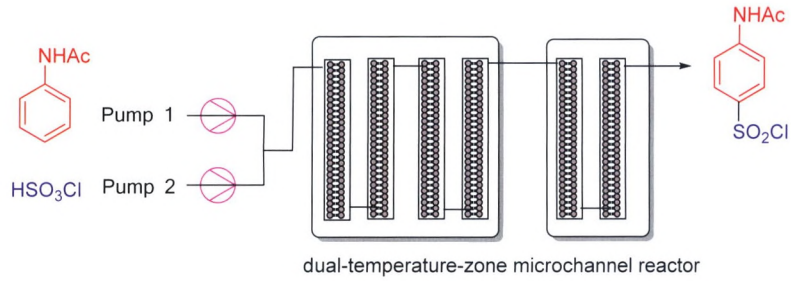
Zong, Lingbo; Chen, Jianbin; Ren, Xinyi; Zhang, Guoying; Jia, Xiaofei*
Chin. J. Org. Chem. **2020**, *40*(8), 2308

The research progress of the application of organic polymer supported catalysts in hydroformylation is summarized, including synthesis, material characteristics and application of supported catalysts. Finally, the future development of them is also prospected.

CONTENT

ARTICLES

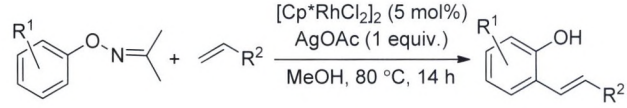
Chlorosulfonation of Acetanilide in a Dual-Temperature-Zone Silicon Carbide Microchannel Reactor and Synthesis of Sulfasalazine



Chlorosulfonation of acetanilide was realized in a highly thermoconductive and corrosion-resistant dual-temperature-zone silicon carbide microchannel reactor. Highly efficient mass and heat transfer, short reaction time, easy control of reaction temperature, and intrinsic safety of microchannel reactor helped to achieve better selectivity, reproducibility, and productivity for organic synthesis.

Zhang, Zishu; Zhao, Yulong; Geng, Huiling*
Chin. J. Org. Chem. **2020**, *40*(8), 2387

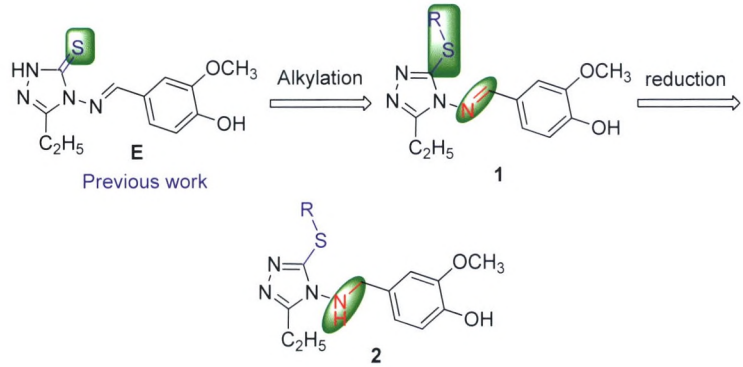
Rhodium-Catalyzed ortho-Alkenylation of Phenols Directed by Acetone Oxime Ether



A high regioselective phenolic compound *ortho*-alkenylation was realized using the weak coordination center acetoxime ether as the guiding group and Rh as the catalyst. The strategy has advantages of simple and mild reaction conditions, wide substrate adaptability, and high regional selectivity.

Liu, Lingling; Yang, Shan; Han, Yi; Dai, Chenyang; Shi, Daqing; Huang, Zhibin*; Zhao, Yingsheng*
Chin. J. Org. Chem. **2020**, *40*(8), 2394

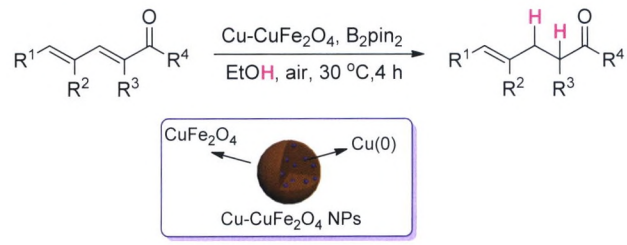
Synthesis, Crystal Structure and Neuraminidase Inhibitory Activity of 1,2,4-Triazole-3-sulfide Derivatives



A series of 1,2,4-triazole-3-sulfide derivatives were designed and synthesized. The preliminary assay of neuraminidase (NA, H1N1) inhibitory activity *in vitro* showed that most of compound **1** has more potent NA inhibitory activity.

He, Mei; He, Chaofan; Liu, Ling; Ye, Jiao*; Hu, Aixi*; Chen, Yun; Xu, Lujie; Liu, Ailin
Chin. J. Org. Chem. **2020**, *40*(8), 2402

Nano Cu-$CuFe_2O_4$-Catalyzed Selective Reduction of $\alpha,\beta,\gamma,\delta$-Unsaturated Carbonyls in Alcohol Medium

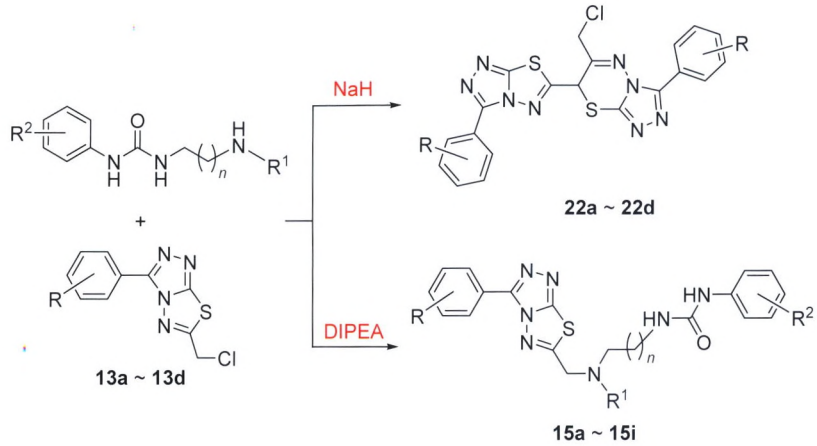


An efficient Cu-$CuFe_2O_4$ nanoparticle-catalyzed protodeboronation strategy has been developed for the chemoselective 1,4-reduction of $\alpha,\beta,\gamma,\delta$-unsaturated ketones, carboxylic ester and cyano-ester. Additionally, the Cu-$CuFe_2O_4$ catalyst has shown excellent performance in gram-scale reactions. Furthermore, the catalytic mechanism has also been discussed. The reactivity of (*E*)-γ,δ-unsaturated carbonyl products enables easy access to 3-buten-1-ols, 3-buten-1-amines, γ-keto acids, cyclic ethers, and cyclic nitrones.

Cong, Yikang; Zeng, Xianghua*
Chin. J. Org. Chem. **2020**, *40*(8), 2411

CONTENT

Design, Synthesis, and Biological Activities of Novel Triazolothiadiazole Derivatives Linked with Amino Side Chain Containing Urea Group as DOT1L Inhibitors

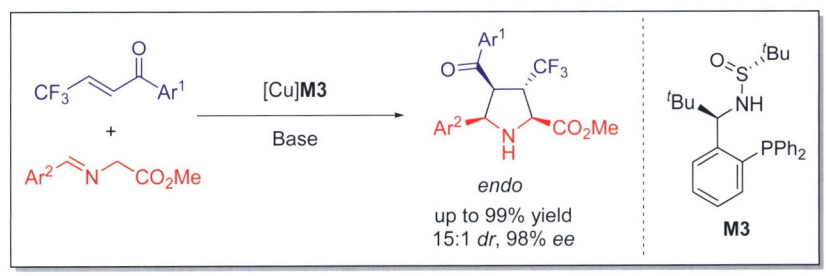


Liu, Na; Guo, Siqi; Liu, Junfang; Chen, Yantao; Xu, Xiaoming; Zhang, Jing; Kang, Yaqing; Luo, Cheng; Chen, Shijie*; Chen, Hua*

Chin. J. Org. Chem. **2020**, *40*(8), 2450

A series of novel triazolothiadiazole derivatives linked with amino side chain containing urea group **15** were designed and synthesized as potential DOT1L (disruptor of telomeric silencing 1-like) inhibitors. The new dimeric analogues **22** bearing with triazolothiadiazole-triazolothiadiazine were obtained by intermolecular reaction of two molecules of **13**.

Ming-Phos/Copper(I)-Catalyzed Asymmetric Intermolecular [3+2] Cycloaddition of Azomethine Ylides with Trifluoromethyl Enones

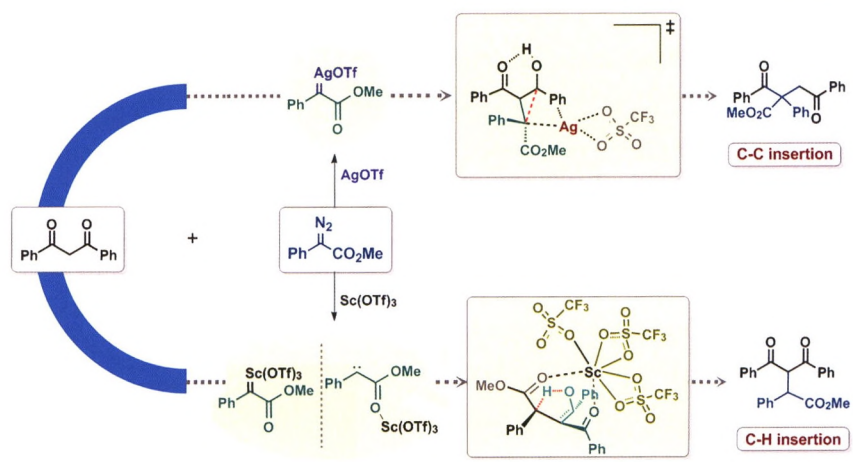


Wu, Lizuo; Zhang, Fengyuan; Zhang, Zhentao; Shang, Lei*; Liu, Yu*

Chin. J. Org. Chem. **2020**, *40*(8), 2460

A highly efficient copper catalyzed asymmetric intermolecular [3+2] cycloaddition of azomethine ylides with β-trifluoromethyl-α,β-unsaturated ketone was realized by using Ming-Phos (**M3**) as ligand. *Endo*-products could be obtained with good to high yield, and diastereo- and enantio-selectivities.

Computational Studies on Reaction Mechanism of the Catalyst-Controlled Selective Insertion of Metal Carbenoids into C—C and C—H Bonds of 1,3-Dicarbonyl Compounds



Cao, Shanshan; Liu, Zhaohong*; Yuan, Haiyan; Yang, Liu; Zhang, Jingping*; Bi, Xihe*

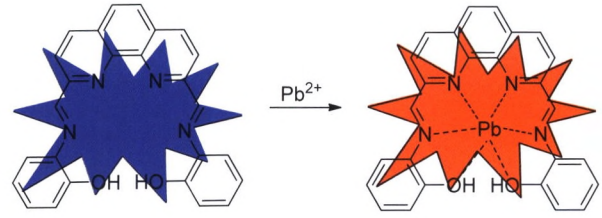
Chin. J. Org. Chem. **2020**, *40*(8), 2468

Computational studies were carried out to investigate the mechanism and chemoselectivity of silver- or scandium-catalyzed insertion of diazo compounds into C—C or C—H bonds of 1,3-dicarbonyl compounds. Computational studies show that the chemoselectivity results from the cooperative effect of ring tension and the difference in coordination number of metal center

CONTENT

NOTES

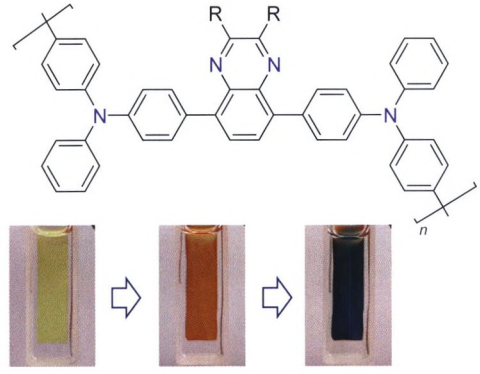
A Novel Phenanthroline-Based Fluorescent Probe for Pb(II)



A novel fluorescent probe **L** for Pb^{2+} based phenanthroline derivative has been designed and synthesized. The bonding mechanism was confirmed by UV-Vis, fluorescence, HRMS, ^1H NMR experiments and theoretical calculation. It was found that the probe had excellent reversibility for detection of Pb^{2+} and could be used to effectively identify Pb^{2+} in living cells.

Mei, Huihui; Yang, Mingyang; Liu, Xiaoyan; Tian, Yuping*; Xu, Kuoxi*
Chin. J. Org. Chem. **2020**, *40*(8), 2508

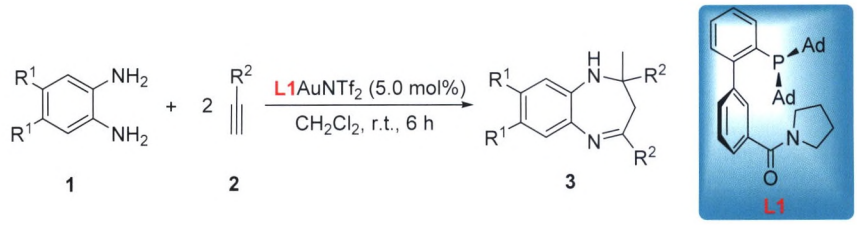
Synthesis and Properties of Donor-Acceptor Type Electrochromic Materials Based on Triphenylamine and Quinoxaline



Two novel donor-acceptor type electrochromic materials were designed and synthesized by electrochemical polymerization, which exhibited pale yellow in the neutral state, and two different colors with the increase of the applied potentials. The novel electrochromic materials showed fast switch rate, good cycle stability as well as good coloration efficiency.

Wang, Wenyuan; Chen, Hongjin; Zhang, Gang; Zhang, Rui*; Liu, Jian*
Chin. J. Org. Chem. **2020**, *40*(8), 2513

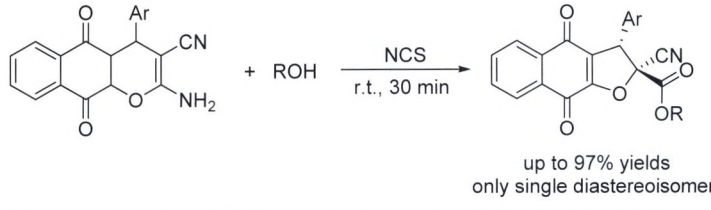
Bifunctional Phosphine Ligand-Enabled Gold(I)-Catalyzed Efficient Synthesis of 1,5-Benzodiazepines



A bifunctional phosphine ligand-coordinated gold(I) catalyst enables direct synthesis of 1,5-benzodiazepines from o-phenylenediamines and alkynes at room temperature.

Zheng, Kanghe; Zhou, Bingwei; Jin, Hongwei; Liu, Yunkui*
Chin. J. Org. Chem. **2020**, *40*(8), 2520

N-Chloro-succinimide-Promoted Efficient Synthesis of Naphthofuran-4,9-dione Derivatives

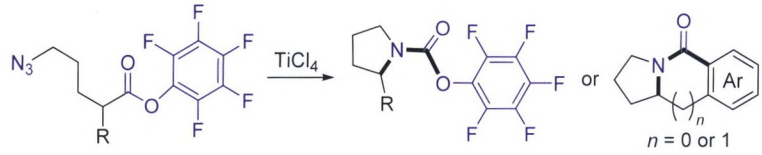


The *N*-chloro-succinimide (NCS)-promoted reaction of 2-amino-benzo[*g*]chromene-3-carbonitriles or ethyl 2-amino-pyrano[3,2-*c*]chromene-3-carboxylates with alcohols lead to naphthofuran-4,9-dione or diethyl furo[3,2-*c*]chromene-2,2-dicarboxylate was reported. All reactions were completed in 30 min under room temperature, and two types of novel fused furan derivatives were obtained in 48%～97% yields under tandem ring-opening/cyclization processes.

Wang, Xiang*; Chen, Ping; Zhi, Sanjun; Hu, Huayou; Kan, Yuhe; Zhang, Zaichao*
Chin. J. Org. Chem. **2020**, *40*(8), 2526

CONTENT

Intramolecular Schmidt Reaction of Alkyl Azides with Pentafluorophenyl Ester



The intramolecular Schmidt reaction of alkyl azides with pentafluorophenyl esters was designed and realized. The Schmidt reaction of 5-azido-pentanoate proceeded smoothly to afford the isocyanate ion as the primary product, and it was converted to a lactam or a carbamate through nucleophilic addition to isocyanate ion with an intermolecular pentafluorophenol anion or an intramolecular arene.

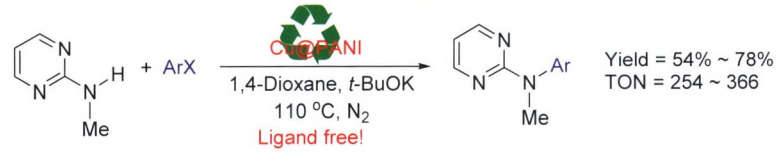
Cao, Zhiqi; Li, Rui*; Su, Yan; Gu, Peiming*
Chin. J. Org. Chem. **2020**, *40*(8), 2555

Visible-Light Promoted Preparation of Benzimidazoles by Eosin Y Catalyzed Reaction of Benzonitrile Derivatives in Water

A novel visible-light-introduced reaction for the construction of benzimidazole derivatives via radical cyclization of *o*-phenylenediamines with benzonitrile derivatives in water has been developed. The reaction has been achieved in high yield under mild conditions by using Eosin Y as photocatalyst.

Lin, Mei*; Wu, Fan; Liu, Tianhui; Chen, Zhitao; Xu, Xiuzhi; Ke, Fang*
Chin. J. Org. Chem. **2020**, *40*(8), 2563

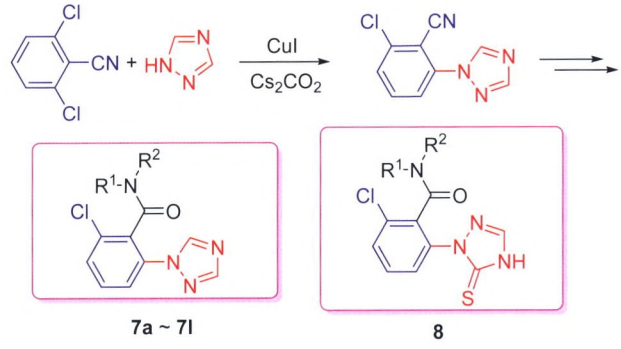
Polyaniline-Supported Copper-Catalyzed Buchwald-Hartwig Couplings of Pyrimidin-2-amines



The polyaniline-supported copper catalyst (Cu@PANI) was synthesized via the oxidative polymerization of aniline in the presence of copper salt. This recyclable heterogeneous catalyst could catalyze the Buchwald-Hartwig couplings of pyrimidin-2-amines free of additional ligands with relatively high catalyst turnover numbers.

Chen, Ying; Jing, Xiaobi*; Yu, Lei*
Chin. J. Org. Chem. **2020**, *40*(8), 2570

Synthesis of 1,2,4-Triazole Benzamide Derivatives and Fungicidal Activity

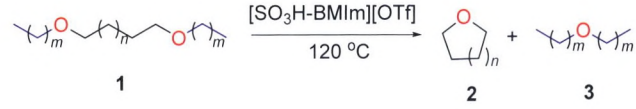


The synthetic route of 1,2,4-triazole benzamide derivatives was explored. A little library of 1,2,4-triazole benzamide derivatives were synthesized. 2-Chloro-*N*-phenyl-6-(1*H*-1,2,4-triazol-1-yl)benzamide (**7i**) showed good antifungal activity against *gaeumannomyces graminis* var. *tritici*. The structure analysis showed that *N*-aryl substituted-benzamides had better activities than those *N*-alkyl, benzyl and allyl.

Jiang, Zhenhua; Cheng, Yi'nan*; Shen, Guofu; Zhang, Mengmeng; Su, Ziyang; Sun, Liansheng; Li, Honglian*
Chin. J. Org. Chem. **2020**, *40*(8), 2575

HIGHLIGHTS

Hydrogen-Bonding Catalyzed Ring-Closing C—O/C—O Metathesis of Aliphatic Ethers for the Construction of O-Heterocycles



Qi, Chaorong; Jiang, Huanfeng*
Chin. J. Org. Chem. **2020**, *40*(8), 2583

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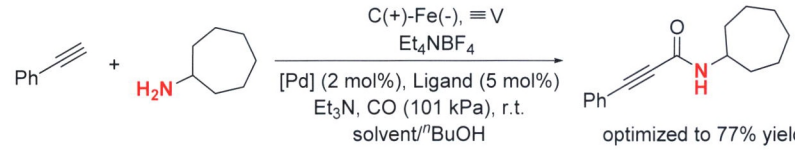
Palladium-Catalyzed Electrochemical Dehydrogenative Aminocarbonylation of Termianl Alkynes

Cheng, Xu*

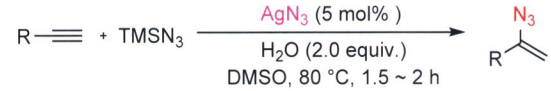
Chin. J. Org. Chem. **2020**, *40*(8), 2600

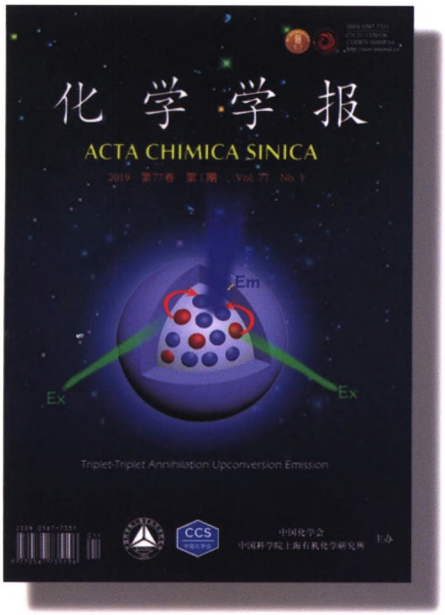


AgN_3-Catalyzed Hydroazidation of Terminal Alkynes and Mechanistic Studies

Li, Fangfang; Chung, Lung Wa*

Chin. J. Org. Chem. **2020**, *40*(8), 2603





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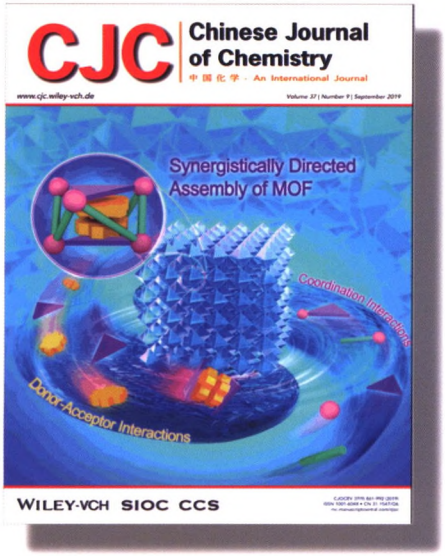

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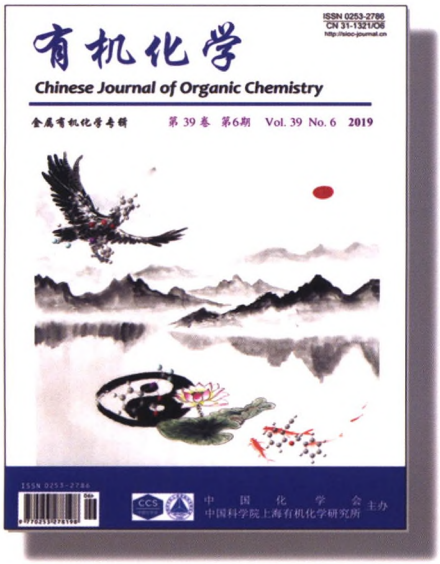

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Chinese Journal of Organic Chemistry

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