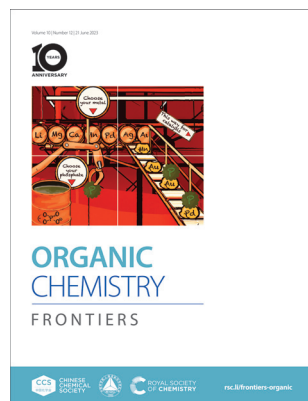


### IN THIS ISSUE

ISSN 2052-4129 CODEN OCFRA8 10(12) 2881–3170 (2023)

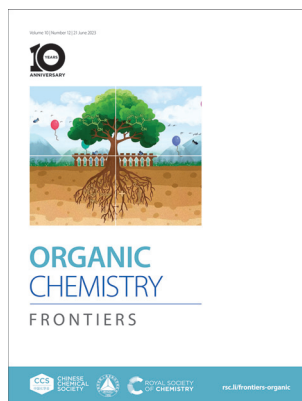


#### Cover

See Nikolai Brodt and Jochen Niemeyer, pp. 3080–3109.

Image reproduced by permission of Jochen Niemeyer from *Org. Chem. Front.*, 2023, **10**, 3080.

We would like to thank Mrs. Dana Kauerhof for creating the cover artwork.



#### Inside cover

See Hua Cao, Xiang Liu *et al.*, pp. 2892–2897.

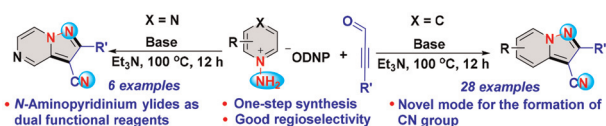
Image reproduced by permission of Xiang Liu from *Org. Chem. Front.*, 2023, **10**, 2892.

### RESEARCH ARTICLES

2892

#### One-step synthesis of cyanated pyrazolo[1,5-a]pyridines utilizing *N*-aminopyridines as a 1,3-dipole and a nitrogen source

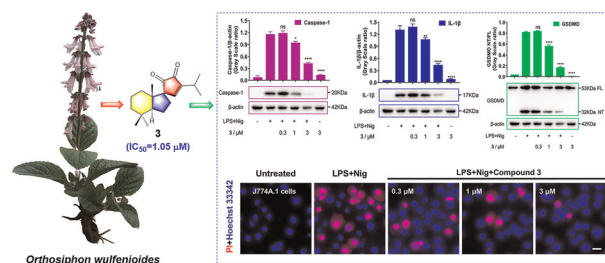
Xiaotian Shi, Yu Lin, Jiaohang Wei, Limin Zhao, Pengfeng Guo, Hua Cao\* and Xiang Liu\*



2898

#### Diterpenoids with a novel 6/5-5 spiro tricyclic skeleton from *Orthosiphon wulfenoides* and their NLRP3 inflammasome inhibitory activity

Wen-Chao Tu, Xing-Jie Zhang, Ying-Xin Zhao, Wei-Chi Chen, Xing-Yu Zhang, Chang-Lin Yang, Muhammad Aurang Zeb, Xiao-Li Li,\* Kaunda-Joseph Sakah, Rui-Han Zhang, Mei-Feng Liu\* and Wei-Lie Xiao\*



## EDITORIAL STAFF

## Executive Editor

Wenjun Liu

## Deputy Editor

Kailin Deng

## Development Editor

Cheng Du

## Editorial Production Manager

Helen Saxton

## Senior Publishing Editor

Becky Webb

## Publishing Editors

Kirstine Anderson, Matthew Bown, Laura Cooper, Hannah Fielding, Clare Fitzgerald, Anoushka Handa, Claire Harding, Alan Holder, Charlie Palmer, Rosie Rothwell, Donna Smith, Laura Smith

## Assistant Editors

Jie Gao, Yu Zhang

## Publisher

Jeanne Andres

For queries about submitted papers, please contact Helen Saxton, Editorial Production Manager, in the first instance. E-mail: [OrgChemFrontiersPROD@rsc.org](mailto:OrgChemFrontiersPROD@rsc.org)

For pre-submission queries please contact Wenjun Liu,

Executive Editor. Email: [OrgChemFrontiersED@rsc.org](mailto:OrgChemFrontiersED@rsc.org)

Organic Chemistry Frontiers (electronic: ISSN 2052-4129) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to RSC Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK Tel +44 (0)1223 432398; E-mail [orders@rsc.org](mailto:orders@rsc.org)

2023 Annual (electronic) subscription price: £2,182; US\$3,492. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at [www.rsc.org/ip](http://www.rsc.org/ip)

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

## Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017;

E-mail [advertising@rsc.org](mailto:advertising@rsc.org)

For marketing opportunities relating to this journal, contact [marketing@rsc.org](mailto:marketing@rsc.org)

## ORGANIC CHEMISTRY

## FRONTIERS

An international, high impact journal for cutting-edge researches from all disciplines of organic chemistry.



CHINESE  
CHEMICAL  
SOCIETY



## rsc.li/frontiers-organic

Published in collaboration with the Chinese Chemical Society and Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences

## Editorial Board

## Editor-in-Chief

Shengming Ma, Shanghai Institute of Organic Chemistry, China

## Associate Editors

Arjan W. Kleij, Institute of Chemical Research of Catalonia, Spain  
Chulbom Lee, Seoul National University, Korea  
Bill Morandi, ETH Zurich, Switzerland

Jennifer M. Schomaker, University of Wisconsin-Madison, USA  
Frank Würthner, University of Würzburg, Germany  
Pei-Qiang Huang, Xiamen University, China  
Qian Zhang, Northeast Normal University, China

## Members

Guy Bertrand, University of California, San Diego, USA  
Nicolai Cramer, EPFL, Switzerland  
Louis Fensterbank, Sorbonne Université, France  
Lichang Wang, Southern Illinois University, USA  
Dan Yang, Westlake University, China

## Advisory Board

Ayyappanpillai Ajayaghosh, National Institute for Interdisciplinary Science and Technology, India  
Lutz Ackermann, Georg-August-Universität Göttingen, Germany  
Marco Bandini, University of Bologna, Italy  
Matthias Beller, University of Rostock, Germany  
Akkattu T. Biju, Indian Institute of Science, India  
Xi Chen, University of California-Davis, USA  
Yiyun Chen, Shanghai Institute of Organic Chemistry, China  
Yonggui Robin Chi, Nanyang Technological University, Singapore  
Stuart Conway, University of Oxford, UK  
Shuanhu Gao, East China Normal University, China  
Véronique Gouverneur, University of Oxford, UK

Frank Glorius, Westfälische Wilhelms-Universität Münster, Germany  
Zhenhua Gu, University of Science and Technology of China, China  
Masayuki Inoue, The University of Tokyo, Japan  
Guochen Jia, Hong Kong University of Science & Technology, China  
Michael Kerr, University of Western Ontario, Canada  
Ohyun Kwon, University of California, Los Angeles, USA  
Rai-Shung Liu, National Tsing Hua University, Hsinchu  
Sanzhong Luo, Tsinghua University, China  
Cristina Nevado, University of Zurich, Switzerland  
Christoph Schalley, Freie Universität Berlin, Germany

Daniel Seidel, University of Florida, USA  
Feng Shi, Jiangsu Normal University, China  
Yian Shi, Colorado State University, USA  
Vinod K. Singh, IIT Kanpur, India  
Wenjun Tang, Shanghai Institute of Organic Chemistry, China  
Yong Tang, Shanghai Institute of Organic Chemistry, China  
Chen-Ho Tung, Technical Institute of Physics and Chemistry, CAS, China  
Tao Ye, Peking University (Shenzhen), China  
Tomoki Ogoshi, Kanazawa University, Japan  
Zhaohui Wang, Tsinghua University, China  
Lizhu Wu, Technical Institute of Physics and Chemistry, CAS, China  
Xingang Zhang, Shanghai Institute of Organic Chemistry, China

## Information for Authors

Full details on how to submit material for publication in Organic Chemistry Frontiers are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be made via the journal's homepage: [rsc.li/frontiers-organic](http://rsc.li/frontiers-organic)

Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of Chemistry, provided that any such republication is accompanied by an acknowledgement in the form: (Original Citation)–Reproduced by permission of the Royal Society of Chemistry.

This journal is © the Partner Organisations 2023.

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

Registered charity number: 207890

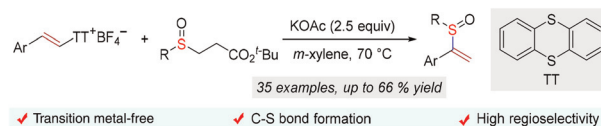


## RESEARCH ARTICLES

2907

### Transition metal-free and regioselective alkenyl C–S cross-coupling reaction of alkenylsulfonium salts

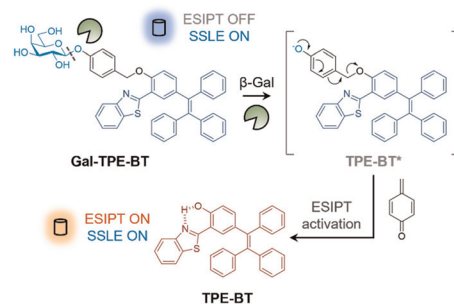
Qiang Wang, Shuaijie Wu, Yi-Dong Wang,\* Jing Sun, Ying Han,\* Chao-Guo Yan and Lei Wang\*



2913

### Ratiometric sensing of $\beta$ -galactosidase based on excited-state intramolecular proton transfer (ESIPT) and solid-state luminescence enhancement

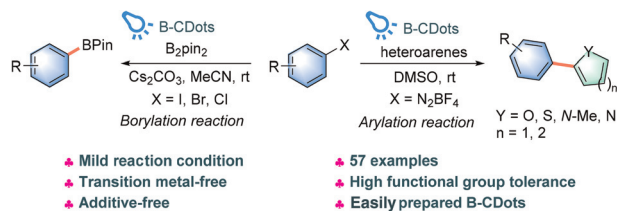
He Tian, Jr., Wei Lin, Xi-Le Hu, Jing-Bo Wang, Min-Yu Zhang, Yi Zang, Xin-Yan Wu, Jia Li,\* Tony D. James\* and Xiao-Peng He\*



2918

### Visible light-induced borylation and arylation of small organic molecules using carbon dots

Tiantong He, Heping Wei, Yuanbo Zhou, Li-ya Jiang, Jonathan B. Baell, Yang Yu\* and Fei Huang\*

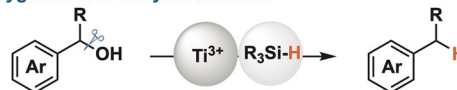


2927

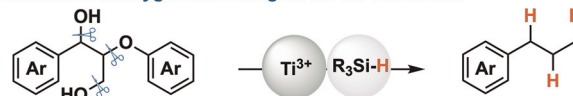
### Titanium-catalysed deoxygenation of benzylic alcohols and lignin model compounds

Alexandru Căciuleanu, Felix Vöhringer and Ivana Fleischer\*

#### Deoxygenation of benzylic alcohols



#### Exhaustive deoxygenation of lignin model substrates

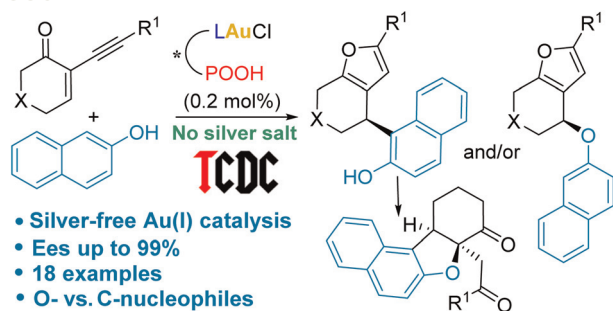


- sustainable 3d-metal catalyst
- silane as H-donor and activator
- functional group tolerance
- reusable side products



## RESEARCH ARTICLES

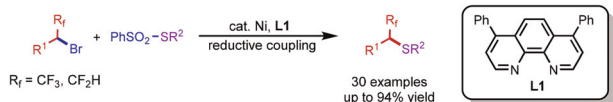
2936



### Enantioselective Au(I)-catalyzed tandem reactions between 2-alkynyl enones and naphthols by the tethered counterion-directed catalysis strategy

Yunliang Yu, Nazarii Sabat, Meriem Daghmoum, Zhenhao Zhang, Pascal Retailleau, Gilles Frison,\* Angela Marinetti\* and Xavier Guinchard\*

2943

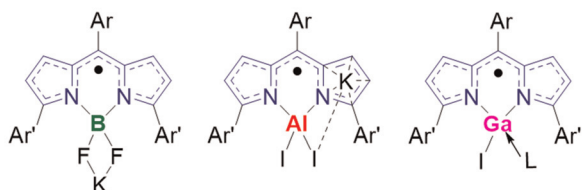


### Synthesis of trifluoromethylated thioethers via Ni-catalyzed reductive C–S coupling

Wei Liu, Yan He, Zhi-Yuan Liu, Yanlin Li, Yan Li, Bing-Bing Wu, Ruo-Xin Jin and Xi-Sheng Wang\*

2949

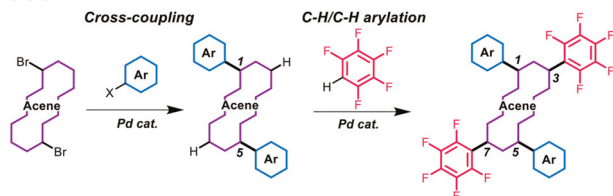
### Crystalline radicals derived from BODIPY and its heavier analogues



### Crystalline radicals derived from boron-dipyrromethene and its heavier analogues

Xinxin Wang, Zhuofeng Xie, Yuyang Dai, Xiaona Liu, Manling Bao, Chen Liu, Qiqi Han, Chunmeng Liu\* and Yuanting Su\*

2955



• Precise regio-selectivity • Different aryl groups

### Straightforward and regiospecific synthesis of 1,3,5,7-tetra-arylated acene bearing different aryl groups

Ryota Sato, Kunfeng Chen, Takeshi Yasuda, Takaki Kanbara\* and Junpei Kuwabara\*

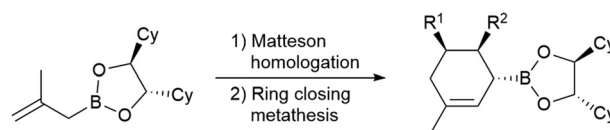


## RESEARCH ARTICLES

2963

### Stereoselective synthesis of five- and six-membered carbocycles *via* Matteson homologation/ring closing metathesis

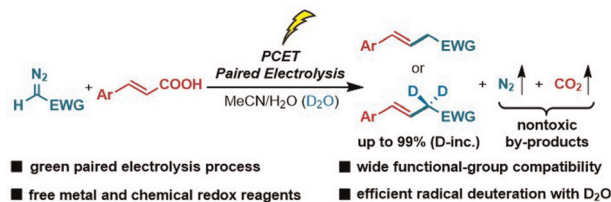
Thorsten Kinsinger and Uli Kazmaier\*



2968

### Paired electrolysis enables decarboxylative coupling of alkenyl acids with diazo compounds

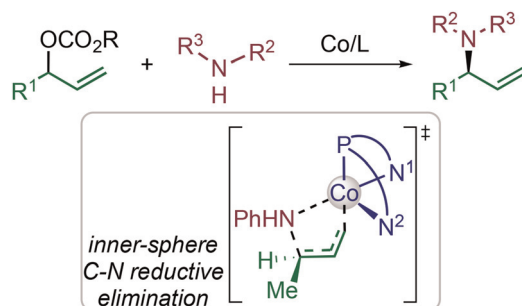
Jingchao Jiao, Yapeng Yan, Qiumin Ke, Yusen Zhang, Hang Huang, Qianwen Gao, Jie Liu\* and Xi Wang\*



2976

### A computational study on cobalt-catalyzed allylic carbonate substitution of racemic allylic carbonates with amines: inner-sphere C–N reductive elimination and origins of regio- and enantioselectivities

Zhen Shen, Hongli Wu, Jinjin Yang, Deping Kong, Jiaao Ge and Genping Huang\*



2988

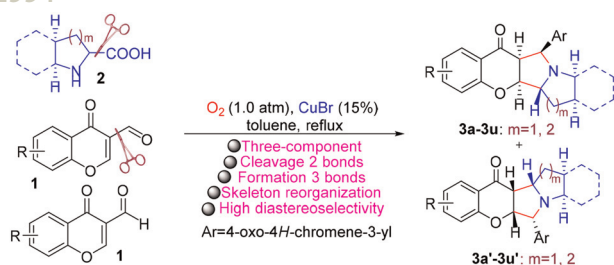
### Chemo- and regioselective cyclization of diene-tethered enynes *via* palladium-catalyzed aminomethylation

Renren Li, Haocheng Zhang, Bangkui Yu\* and Hanmin Huang\*



## RESEARCH ARTICLES

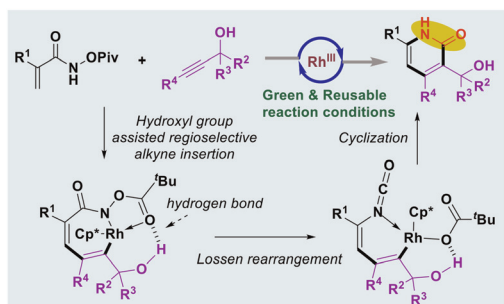
2994



### Cu-catalyzed decarboxylative annulation of proline derivatives: multi-component synthesis of functionalized chromeno[2,3-*c*]-pyrrol-9(1*H*)-one derivatives

Li Chen, Jin-Mei Qi, Shu Yang, Si-Nuo Sun and Sheng-Jiao Yan\*

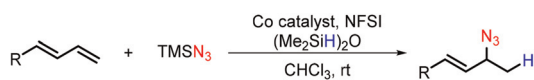
3000



### Rhodium-catalyzed regioselective C–H activation/Lossen rearrangement/annulation for the green synthesis of trisubstituted 2-pyridones

Yidi Li, Huiying Xu, Lin Huang, Zhi Zhou,\* Zhenhao Tang, Haifang Meng, Wei Zhang, Wei Yi\* and Xiaowei Wu\*

3010

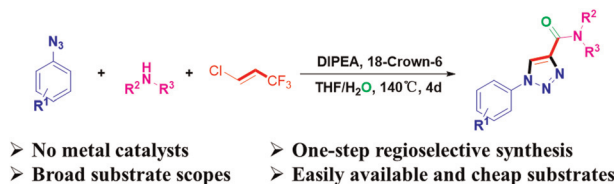


- Mild conditions
- Readily available substrates
- High 1,2-regioselectivity

### Cobalt-catalyzed regioselective hydroazidation of 1-aryl-1,3-dienes: facile access to allylic azides

Mei-Hua Shen, Xiao-Wen Qi, De-Xia Li, Xin-Yi Wang, Chi-Fan Zhu\* and Hua-Dong Xu\*

3016



### Metal-free 1,3-dipolar cyclization of azides with HFO-1233zd(*E*) in the presence of amines: one-step regioselective synthesis of 1-*N*-substituted 1,2,3-triazole-4-carboxamide derivatives

Jing Wang, Qian Yu, Zheng Wang, Zheteng Zhang, Linghui Zeng, Chong Zhang, Huajian Zhu,\* Jiaan Shao\* and Jiankang Zhang\*

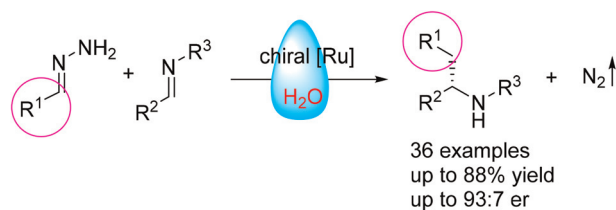


## RESEARCH ARTICLES

3021

**Asymmetric addition of hydrazones as alkyl carbanion equivalents with aryl imines in water**

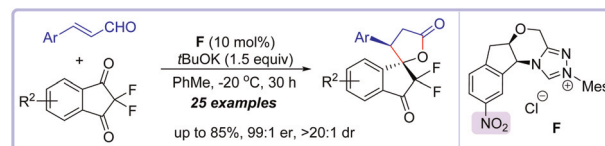
Yi-Zhan Wang, Shao-Dong Liu, Liang Cheng, Li Liu\* and Chao-Jun Li\*



3027

**N-heterocyclic carbene-catalyzed enantioselective synthesis of spirocyclic ketones bearing gem-difluoromethylenes**

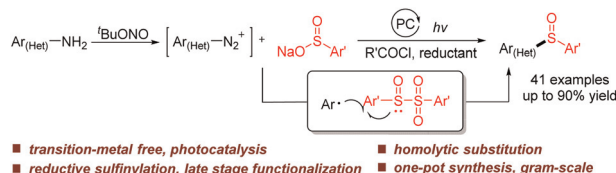
Zheng Liang, Jibin Li, Chaolei Liu, Yiwei Zhu\* and Ding Du\*



3033

**A reductive Sandmeyer-type reaction for the synthesis of sulfoxides from anilines under photocatalysis**

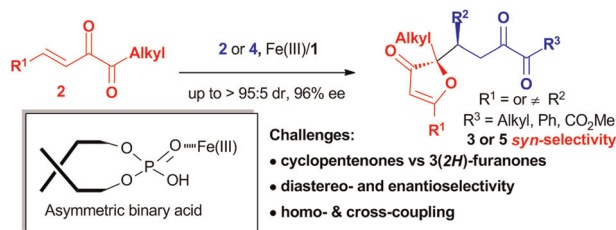
Gangqi Peng, Hao Cheng, Xiya Cheng, Yang He, Yuanyuan An,\* Jie Wu\* and Danqing Zheng\*



3039

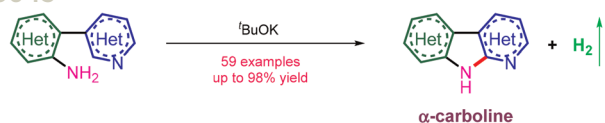
**Asymmetric binary-acid catalysis: a diastereo- and enantioselective oxa-Nazarov cyclization-Michael addition of conjugated 1,2-diketones**

Yuan Tian, Mengdie Tang, Changshuo Lian, Ran Song, Daoshan Yang and Jian Lv\*



## RESEARCH ARTICLES

3045

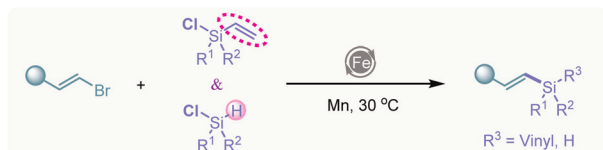


- Transition metal-free
- Atom- and step-economy
- H<sub>2</sub> as the sole by-product
- Without pre-functionalization
- Intramolecular Chichibabin-type amidation with weak nucleophilic anilines

### Metal-free heteroarene C(sp<sup>2</sup>)-H amination with unprotected (hetero)arylamines

Tao Wen, Zhen Zhang,\* Lihua Ye, Chihong Zhang, Bo Jin, Wenkun Wang, Zhong-Ning Chen and Hu Cai\*

3052



- ★ ~60 examples, up to 99% yield
- ★ excellent functional group tolerance
- ★ simple and mild conditions
- ★ modifications and synthetic applications

### Iron-catalyzed cross-electrophile coupling of bromostyrenes and chlorosilanes

Ying Lin, Liang Zou, Renren Bai, Xiang-Yang Ye,\* Tian Xie\* and Yang Ye\*

3061

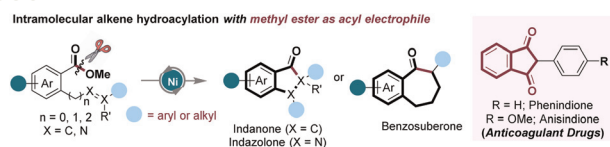


- Dual nickel/photoredox catalysis.
- Good functional group compatibility.
- Modular and facile protocol.
- Readily available starting materials

### Cross-coupling of aldehydes and $\alpha$ -bromophosphonates to modularly access $\alpha$ -substituted- $\beta$ -ketophosphonates under dual nickel/photoredox catalysis

Xinxuan Li, Hepan Wang and Tao XU\*

3067



- > 40 examples, up to 94 %
- Good functional group tolerance
- Easy post-synthetic modification
- Total synthesis and LSF of pharmaceuticals
- Excellent free radical scavenging activities

### Expedient assembly of densely functionalized indanones via nickel-catalyzed alkene hydroacylation with methyl esters

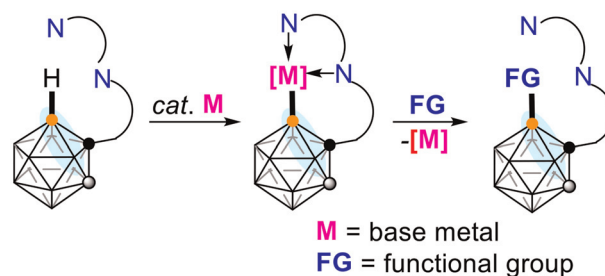
Min Zeng, Fuli Huang, Minghui Zhu, Jichao Ding, Tong Qin, Maoting Xu, Wanqing Liu, Jun Lu, Jicheng Wu,\* Xurong Qin\* and Qiao Ren\*



3074

### A strategy for regioselective B–H functionalization of *o*-carboranes via base metal catalysis

Jie Zhang and Zuowei Xie\*



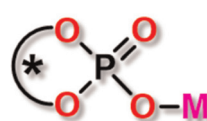
## REVIEWS

3080

### Chiral organophosphates as ligands in asymmetric metal catalysis

Nikolai Brodt and Jochen Niemeyer\*

#### Asymmetric catalysis with metal-phosphates

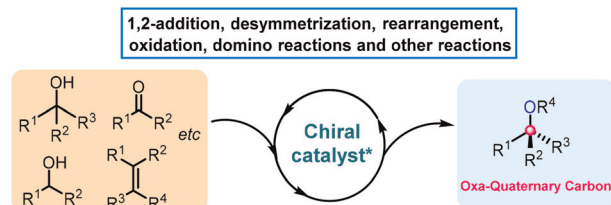


**M** = Li, Mg, Ca, In, Bi,  
Ti, Mn, Rh, Pd, Ag, Au,  
Yb

3110

### Recent advances in the asymmetric catalytic construction of oxa-quaternary carbon centers

Yu-Ping He, Di Tian, Xing-Zi Li and Hua Wu\*



3130

### Progress in catalytic asymmetric $\alpha$ -functionalization of vinylogous nucleophilic species

Zhen-Hua Wang,\* Yong You, Jian-Qiang Zhao, Yan-Ping Zhang, Jun-Qing Yin and Wei-Cheng Yuan\*

