



生物有机与分子工程教育部 重点实验室

2004 年度工作报告

2005 年 1 月

首先在新春到来之际祝各位在新的一年里身体健康、工作顺利、生活愉快！也借此机会对于各位多年来给予教育部生物有机与分子工程重点实验室的关心和支持表示衷心的感谢。

在过去的一年中，我们重点实验室的各方面工作取得了一些新的进展。在 2004 年度新增科研项目共 7 项，总经费 117 万元。重点实验室成员获得中国化学会“黄耀曾金属有机化学奖”；中国化学会“有机合成创造奖”“有机合成提名奖”以及中国化学会-BASF“青年知识创新奖”等奖项。04 年发表科研论文 109 篇，其中 SCI 论文 70 篇，影响因子大于 3.0 的论文 15 篇（包括 *Angew. Chem.* 和 *JACS* 各一篇）。

人才队伍的建设一直是我们的实验室近年来的中心工作。在 04 年又有两位年轻学术带头人加入我们的行列。余志祥博士从美国 UCLA Houk 研究组回来，在我们重点实验室建立理论有机化学课题组。施章杰博士在美国哈佛大学（Verdine 研究组）和芝加哥大学（何川研究组）完成博士后研究以后回国，他将在本实验室建立金属有机和化学生物学研究组。重点实验室的年青学术带头人中在 04 年又有一位获得国家杰出青年基金（裴坚博士）。目前本实验室共有 5 位国家杰出青年基金获得者，2 位长江特聘教授，2 人曾获教育部跨世纪人才基金。



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在仪器设备方面，04 年度启动的“十五”“211”工程化学学科建设给予本实验室一定的支持。在过去的一年里我们添置了红外光谱仪，气相色谱手性柱系统，手套箱以及一批 Buchi 旋转蒸发仪。这些仪器的购置进一步改善了科研条件。

人才培养方面，04 年本实验室共有 5 位博士后出站，8 位博士生顺利通过论文答辩获得博士学位。目前本实验室有在站博士后 12 人，在读博士 59 人，在读硕士 24 人。

在 2004 年本重点实验室共有 4 项开放课题，目前均已经完成。在对外交流方面，我们邀请了 10 余位国内外知名学者前来讲学，包括普渡大学 Negishi 教授，马里兰大学 Doyle 教授，匹兹堡大学 Cohen 教授等。本实验室的成员也积极参加国内外学术会议。另外，我们实验室协助主办了第十三届全国金属有机化学学术研讨会（北京，2004 年 10 月 19-22 日），受到国内同行的普遍好评。



有机化学学术研讨会（北京，2004 年 10 月 19-22 日），受到国内同行的普遍好评。

在回顾这些进展的同时，我们也认识到本实验室的工作尚有许多不足，和其他优秀的实验室比较还有不小的差距。在新的一年里，我们将做好研究队伍的整合工作，提高实验室承担国家重大研究项目的的能力，并进一步明确实验室的定位和发展方向，向更高的目标努力。

- 附件一、2004 年度获奖情况
- 附件二、2004 年度来访讲学
- 附件三、2004 年度重点实验室发表论文

附件一、2004 年度获奖情况

- 1) 首届中国化学会“黄耀曾金属有机化学奖”(席振峰)。
- 2) 中国化学会“有机合成创造奖”(席振峰)。
- 3) 中国化学会-BASF“青年知识创新奖”(席振峰)。
- 4) 中国分析测试协会“CAIA”二等奖(获奖项目: 原位核磁分析技术在金属有机化合物促进的有机合成新反应新方法研究中的应用(席振峰、李丕旭、宋秋玲、陈敬龙、赵长家、高晔))。
- 5) 中国化学会有机合成提名奖(王剑波)。
- 6) 《基础有机化学》系列课程获得北京市精品课程称号(王剑波等)。
- 7) 中国分析测试协会科学技术奖(CAIA 奖)一等奖(项目名称: 荧光化学传感器新原理与新方法的研究(杨荣华、李克安、赵凤林、陈永康))。

附件二、2004 年度来访讲学

- 1) 秋山隆彦(Takahiko Akiyama)教授; 日本学习院大学理学部
Enantioselective addition and cycloaddition reactions with imines; chiral Lewis Acid catalyst and chiral Bronsted acid catalyst.
2004 年 8 月 27 日
- 2) Dieter Fenske 教授; Universität Karlsruhe(德国卡尔斯鲁厄大学)
Transition Metal Clusters with Main Group Elements as Ligands
2004 年 5 月 17 日
- 3) Pierre H. Dixneuf 教授; CNRS-Universite de Rennes, France
i. New European System of University Education and International Master in English in Rennes
ii. Recent Achievements of Ruthenium Catalysts for Fine Chemicals Production: Alkene Metathesis and Atom Economy Reactions.
2004 年 4 月 14 日
- 4) M. P. Doyle 教授; 美国马里兰大学化学与生物化学系
New Advances in Catalysis with Dirhodium Compounds
2004 年 7 月 2 日
- 5) Joan S. Valentine 教授; UCLA 化学与生物化学系
Why is Abnormal Copper-Zinc Superoxide Dismutase Toxic
2004 年 7 月 2 日
- 6) Todd B. Marder 教授; Department of Chemistry, University of Durham, England

Transition Metal Catalysed Borylations Including C-H Bond Functionalisation

2004年2月26日

7) Martin Newcomb 教授; LAS Distinguished Professor; Department of Chemistry; University of Illinois at Chicago

Laser Flash Photolysis Studies of Models for Radical Rearrangements in Coenzyme B12-Dependent Enzymes

2004年5月14日

8) Yoichi Sasaki 教授; 日本北海道大学理学部

Metal Cluster Complexes as Mediators of Electronic Communications: from Solution Properties to Surface Modulators

2004年5月27日

9) Richard G. Weiss 教授; Department of Chemistry, Georgetown University, USA

Photochemical and Photophysical Studies in Polyolefinic Media

2004年6月2日

10) Yongmin Zhang 教授; Ecole Normale Supérieure, Département de Chimie, UMR CNRS, France
Carbohydrate Chemistry and Drug Discovery

2004年2月26日

11) 陈德恒 教授; 香港理工大学, 北京大学名誉教授

Developing Green Chemistry - Organometallic Reactions in Water and other Alternative Media

2004年5月12日

12) 蒋耀忠 教授; 中国科学院成都有机化学研究所

新型手性配体和不对称催化反应

2004年9月8日

13) 刘元红 研究员; 中国科学院上海有机化学研究所

金属杂环化合物的形成及其促进的碳-碳键形成反应

2004年6月8日

14) 肖毅 博士; Merck & Co., Inc. USA

An Insider's View of Process Research: The Search for the Ultimate Synthesis

2004年12月10日

15) 余金泉 博士; Royal Society University Research Fellow, University of Cambridge, UK
Elucidation and exploitation of reaction pathways: reduction, oxidation and C-H activation

2004年1月5日

附件三、2004 年度重点实验室发表论文

- 1) A Highly Stereoselective Addition of the Anion Derived from α -Diazoacetamide to Aromatic (*N*-Tosyl)imines
Yonghua Zhao, Zhihua Ma, Xiaomei Zhang, Yaping Zou, Xianglin Jin and Jianbo Wang
Angew. Chem. Int. Ed. **2004**, *43*, 5977-5980.
- 2) Stereoselective Reduction of β -Hydroxy α -Ketoesters: A Concise Synthesis of *anti* - α,β -Dihydroxy Esters
Mingyi Liao, Wengang Yao and Jianbo Wang
Synthesis, **2004**, 2633-2636.
- 3) Unusual Reaction of beta-Hydroxy alpha-Diazo Carbonyl Compounds with TsNHN=CHCOCl/Et₃N
Weifeng Shi, Bo Zhang, Bingjie Liu, Feng Xu, Fengping Xiao, Jian Zhang, Shiwei Zhang, Jianbo Wang
Tetrahedron Lett. **2004**, *45*, 4563-4566.
- 4) An Efficient and Mild Preparation of Vinyl Diazo Carbonyl Compounds
Weifeng Shi, Ming Ma, Jianbo Wang
Chin. Chem. Lett. **2004**, *15*, 911-914.
- 5) Linear Free Energy Correlation Analysis on the Electronic Effects of Rh(II) Carbene O-H Insertion
Zhaohui Qu, Weifeng Shi and Jianbo Wang
J. Org. Chem. **2004**, *69*, 217-219.
- 6) Reaction of oxazirconacycloheptenes with aldehydes mediated by CuCl: one-pot synthesis of tetrahydrofuran derivatives from four different components involving two molecules of the same or different aldehydes, an ethylene and an alkyne
Changjia Zhao, Jiang Lu, Zhiping Li, Zhenfeng Xi
Tetrahedron, **2004**, *60*, 1417-1424.
- 7) Reactions of 1,4-dilithiobutadienes with isothiocyanates: preparation of iminocyclopentadiene derivatives via cleavage of the C = S double bond of a RN = C = S molecule
Congyang Wang, Qiuling Song, Zhenfeng Xi
Tetrahedron, **2004**, *60*, 5207-5214.
- 8) Concise synthesis of stereodefined dienols and cyclopentadienes via direct addition of 1-bromomagnesiobutadienes and 1-lithiobutadienes to carbonyl compounds
Hongyun Fang, Qiuling Song, Zhihui Wang, Zhenfeng Xi
Tetrahedron Lett., **2004**, *45*, 5159-5162.
- 9) Reaction chemistry of 1,4-dilithio-1,3-diene and 1-lithio-1,3-diene derivatives (Microreview)
Zhenfeng Xi
Eur. J. Org. Chem., **2004**, 2773-2781.

- 10) Reactions of substituted (1,3-butadiene-1,4-diyl)magnesium, 1,4-bis(bromomagnesium) butadienes and 1,4-dilithiobutadienes with ketones, aldehydes and PhNO to yield cyclopentadiene derivatives and N-Ph pyrroles by cycloalkenylation
Hongyun Fang, Guotao Li, Guoliang Mao, Zhenfeng Xi
Chem. Eur. J., **2004**, *10*, 3444-3450.
- 11) Formation of 2,6-dioxabicyclo[3.3.0]octa-3,7-dienes or multiply substituted *o*-benzoquinones from reactions of 1,4-dilithio-1,3-dienes with dimethyl oxalate
Guoliang Mao, Jiang Lu and Zhenfeng Xi
Tetrahedron Lett., **2004**, *45*, 8095-8098.
- 12) Synthesis, structural characterization, and skeletal rearrangement of dibenzo tricyclo[3.3.0.0^{2,6}]-1,2,5,6-tetrasubstituted-octanes
Guotao Li, Hongyun Fan, Shiwei Zhang, and Zhenfeng Xi
Tetrahedron Lett., **2004**, *45*, 8399-8402.
- 13) Zirconocene-mediated intermolecular coupling of one molecule of Si-tethered diyne with three molecules of organonitriles: One-pot formation of pyrrolo[3,2-*c*]pyridine derivatives via cleavage of C-N triple bonds of organonitriles
Xiaohua Sun, Congyang Wang, Zhiping Li, Shiwei Zhang, Zhenfeng Xi
J. Am. Chem. Soc., **2004**, *126*, 7172-7173.
- 14) Selective Preparation of Oxygen-Rich [60]Fullerene Derivatives by Stepwise Addition of tert-Butylperoxy Radical and Further Functionalization of the Fullerene Mixed Peroxides
Shaohua Huang, Zuo Xiao, Fudong Wang, liangbing Gan, et al.
J. Org. Chem., **2004**, *69*, 2442-2453.
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Xiang Zhang, Liangbing Gan, Shaohua Huang and Yaru Shi
J. Org. Chem., **2004**, *69*, 5800-5802.
- 16) Synthesis of Novel Palladacycles and Their Application in Heck and Suzuki Reactions under Aerobic Conditions
Xiong, Z.; Wang, N.; Dai, M.; Li, A.; Chen, J.; Yang, Z.
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- 17) Synthesis of a Novel C₂-Symmetric Thiourea and Its Application in the Pd-Catalyzed Cross-Coupling Reactions with Arenediazonium Salts under Aerobic Conditions
Dai, M.; Liang, B.; Wang, C.; Chen, J.; Yang, Z.
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Synthesis, Optical Properties, and Investigation of Thermal Spectral
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X.-H. Zhou, J.-C. Yan, J. Pei
Macromolecules, **2004**, 37, 7078-7080.

22) Giant extended pi-conjugated dendrimers containing the 10,15-dihydro-5H-diindeno [1,2- α ;1',2'-c]fluorene chromophore: Synthesis, NMR behaviors, optical properties, and electroluminescence
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Xu, Jiaxi, Xu Shu
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Gao Yuanhe, Zhang Qihan, Xu Jiaxi
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25) 非对称氮杂环丙烷的亲核开环反应及其区域选择性
马琳鸽, 许家喜
化学进展, **2004**, 16(2), 220-235.

26) Mass spectrometric fragmentation of 2a,4-disubstituted
2,2a,3,4-tetrahydro-2-phenoxyl-1*H*-azeto[2,1-*d*][1,5]benzothiazepin-1-ones under electron impact
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Xu Jiaxi, Huang Xu
Rapid Commun. Mass Spectrom., **2004**, 18(8), 859-862.

27) Intermolecular phenolic hydroxy methylation occurring between chiral
N,N'-bis(2-hydroxyphenyl)-2,2-dimethyl-1,3-dioxolane-4,5-dicarbamide and co-crystallized methanol
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Xu Jiaxi, Jiao Peng, He Zheng, Zhang Qihan, Yan Chunhua

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Du Da-Ming, Carlier, Paul R.

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Lu Shao-Feng, Du Da-Ming, Zhang Shi-Wei, Xu Jiayi

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Fu Bin, Du, Da-Ming, Wang Jianbo

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40) Enantiospecific synthesis of pyridinylmethyl pyrrolidinemethanols and catalytic asymmetric borane reduction of prochiral ketones

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42) New chiral pyridine prolinol derivatives and preliminary study on asymmetric catalytic reaction

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