学科进展系列报告

报告题目：**Amino Acid-based Bifunctional Phosphines for Enantioselective Catalytic Reactions**

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报告地点：化学西楼一楼多功能厅

邀 请 人：陈芬儿　教授

Amino Acid-based Bifunctional Phosphines for Enantioselective Catalytic Reactions

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This talk will be focused on our adventures in asymmetric nucleophilic phosphine catalysis. Recently, we disclosed a series of bifunctional phosphines based amino acid structural motifs (Figure 1). Our phosphine catalysts can be readily prepared, and their structures are highly tunable. Moreover, such phosphine catalysts possess excellent stability, and can be used directly for reactions without inert gas protection. Up to date, we have successfully applied our phosphine catalysts to enantioselective aza-Morita–Baylis–Hillman (MBH) & MBH reactions, a range of [3+2] cycloadditions, different [4+2] cycloadditions, [4+1] annulation, allylic alkylations, Michael addition, and γ-addition reactions. The details of our investigations will be presented, and some mechanistic understandings will also be discussed.

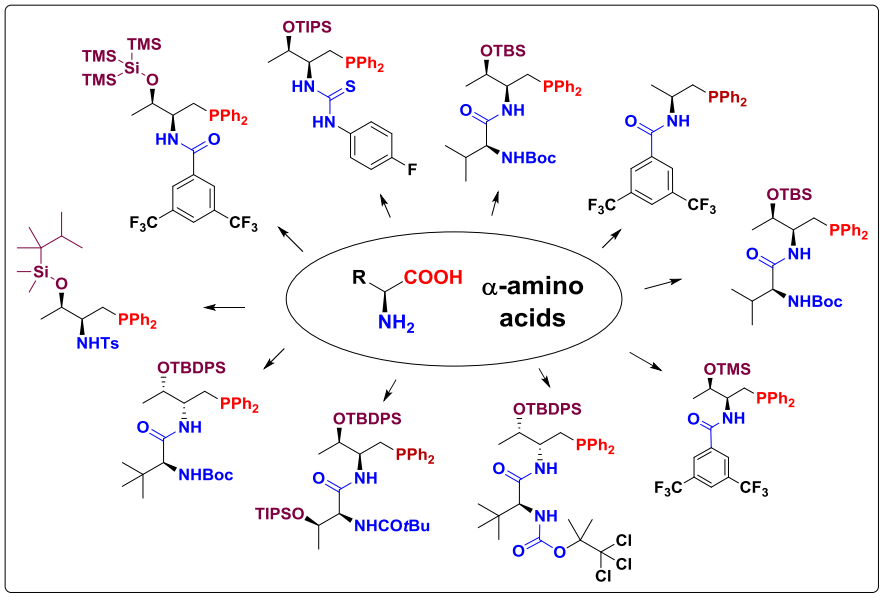

Figure 1: Selected examples of amino acid-based bifunctional phosphines

Selected References:

- T. Wang, Z. Yu, D. L. Hoon, C. Y. Phee, Y. Lan, Y. Lu, *Am. Chem. Soc.*, **2016**, *138*, 265.
- Yao, W.; Dou, X.; Lu, Y. *J. Am. Chem. Soc.*, **2015**, *137*, 55.
- X. Han, W. Yao, T. Wang, Y. R. Tan, Z. Yan, J. Kwiskowski, Y. Lu, *Angew. Chem. Int. Ed.* **2014**, *53*, 5643.
- T. Wang, W. Yao, F. Zhong, G. H. Pang, Y. Lu, *Angew. Chem. Int. Ed.* **2014**, *53*, 2964.
- F. Zhong, X. Dou, X. Han, W. Yao, Q. Zhu, Y. Meng, Y. Lu, *Angew. Chem. Int. Ed.* **2013**, *52*, 943
- F. Zhong, J. Luo, G.-Y. Chen, X. Dou, Y. Lu, *J. Am. Chem. Soc.* **2012**, *134*, 10222.
- X. Han, F. Zhong, Y. Wang, Y. Lu, *Angew. Chem. Int. Ed.* **2012**, *51*, 767.
- F. Zhong, X. Han, Y. Wang, Y. Lu, *Angew. Chem. Int. Ed.* **2011**, *50*, 7837.
- X. Han, Y. Wang, F. Zhong, Y. Lu, *J. Am. Chem. Soc.* **2011**, *133*, 1726.

Short Biography

Yixin Lu (卢一新) studied chemistry and received his B.Sc. from Fudan University, Shanghai, and continued his graduate studies in Canada and obtained his Ph.D. in Organic Chemistry under the supervision of the late Prof. George Just from McGill University in 2000. After a short postdoctoral stay with Prof. Peter W. Schiller at Clinical Research Institute of Montreal, Canada, and he then joined Prof Ryoji Noyori's group in Nagoya University as an RCMS. He started his independent career at the National University of Singapore (NUS) in September, 2003, and he is now a Professor and Deputy Head of Department of Chemistry, NUS. He was a recipient of the Asian Core Program (ACP) Lectureship awards to Japan, China, Taiwan, and Korea from 2009–2014, and he won Young Scientist Award & Outstanding Scientist Award from the Faculty of Science, NUS in 2009 and 2013, respectively. In March 2013, he received GSK–SNIC Award in Organic Chemistry, and he was awarded the Dean's Chair Professorship in July 2013. His research is focused on synthetic organic chemistry and medicinal chemistry. One of the key areas is asymmetric synthesis and catalysis, and he is particularly interested in developing amino acid-derived organic catalysts for enantioselective reactions.

卢一新，博士，新加坡国立大学化学系教授，现任新加坡国立大学化学系执行主

任。1991 年毕业于复旦大学, 获理学学士学位, 2000 年获加拿大麦吉尔大学博士学位。2000–2001 期间跟随著名诺贝尔化学得主 Professor Ryoji Noyori （野依良治）从事博士后研究工作。2003 年加入新加坡国立大学化学系，进行不对称催化以及药物化学的研究。十多年来，取得了许多开创性的研究成果。其中，率先在国际上进行氨基酸衍生的双官能团、多官能团催化剂的研究及其拓展其在不对称合成中的应用。迄今在国际顶级期刊发表论文一百三十余篇，其中包括世界一流期刊美国化学会志 J. Am. Chem. Soc.和德国应用化学 Angew. Chem. Int. Ed.等杂志上的论文被国际同行大量援引，多数工作被德国 SYNFACTS 杂志作为亮点文章进行报道（highlight），具有很高的国际知名度。由于卢教授丰硕的研究成果，他还荣获包括“新加坡国立大学杰出学者” ,“新加坡国立大学青年科学家”, “新加坡院长讲座教授”, 和“葛兰素史克–新加坡化学会有机化学奖” 等诸多奖项, 以及多次的亚洲前沿有机化学报告奖，并多次受邀去日本、台湾、韩国、美国、瑞士等国家和地区讲学。此外，卢一新教授注重工业化应用，其首次报道的氨基酸二肽叔膦催化剂已被日本东京化成公司商业化，并和多家公司建立合作关系，也曾获得著名跨国制药公司“葛兰素史克”工业奖项。