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教育背景及工作经历

- 2012/01-至今 **研究员, “百人计划”, 博导**
中国科学院上海有机化学研究所 (SIOC)
- 2008/05 – 2011/12 **副研究员, 课题组长, 研究生导师**
中国科学院上海有机化学研究所 (SIOC)
- 2003/08 – 2008/03 **博士后及研究助理, 化学生物学, 导师: Wilfred A. van der Donk**
美国伊利诺伊大学香槟分校 (University of Illinois at Urbana-Champaign, UIUC)
- 1998/09 – 2003/07 **博士, 有机化学, 导师: 卿凤翎**
中国科学院上海有机化学研究所 (SIOC)
- 1994/09 –1998/07 **学士, 应用化学, 四川大学**

获奖及荣誉

- 2017 年 “万人计划” 科技创新领军人才
- 2016 年 科技部中青年科技创新领军人才
- 2015 年 英国皇家化学会氟化学奖 (RSC Fluorine Chemistry Prize)
- 2015 年 第五届中国化学会—英国皇家化学会青年化学家奖
- 2015 年 上海市科技系统青年五四奖章
- 2014 年 国家“杰出青年科学基金”
- 2014 年 Thieme Chemistry Journal Award 2014
- 2013 年 中国科学院“优秀研究生指导教师”奖
- 2012 年 中国科学院上海有机所“百人计划”
- 2009 年 上海市“青年科技启明星”计划

研究方向

本课题组围绕有机氟化学领域，针对目前由于缺乏对氟效应在化学成键过程中一些内在本质规律的认识，尤其在有机合成中，由于氟原子以及含氟基团的氟效应会造成一些非正常反应的发生，以致于一些与经典 C-H 有机化学类似的有机氟化学反应不能按预期发生，具有很大的挑战性和不可预见性这一重要科学问题，以过渡金属催化为手段，从新反应性、新成键模式和新功能的理念出发，通过新催化体系的建立和含氟试剂新特性的发现，发展高效安全、环境友好、原子/步骤经济、可控构筑与转化含氟有机化合物的方法和理论，解决其中有机氟化学存在的重要科学问题，进而利用所发展方法合成特种含氟功能

材料和具有生物活性的含氟分子。目前主要集中在三个研究方向：

- 1) **金属有机氟化学** 以过渡金属催化为手段，研究廉价易得的含氟工业原料和工业废弃物的转化，使之具有工业应用前景，建立高效廉价金属催化体系，发展高效温和的氟化新策略、新反应、新方法以及相关理论；
- 2) **化学生物学相关研究** 应用化学生物学手段研究和发现新的含氟生物活性分子，探索氟原子对相关生物活性分子影响的内在本质规律；利用氟原子的特性发展对多肽、蛋白，核酸进行选择性的修饰的方法，并进一步应用到化学生物学中；
- 3) **能源相关含氟材料的研究** 基于所发展方法研究含氟化合物在光伏和电池材料方面的应用

论文发表

独立成立课题组的工作 (2008 年至今)

1. Zhang Feng,† Qiao-Qiao Min,† Xia-Ping Fu,† Lun An and **Xingang Zhang,*** “Chlorodifluoromethane-Triggered Formation of Difluoromethylated Arenes Catalysed by Palladium”, *Nat. Chem.* **2017**, 9, 918-923 (This paper was highlighted by *Chemical & Engineering News* 2017, 95, 7; ACS Molecule of the Week, 2017, June 19)
2. Wen-Hao Guo, Zhi-Ji Luo, Wenbing Zeng and **Xingang Zhang,*** “Access to Difluoromethylene-Skipped 1,4-Diynes with *gem*-Difluoropropargyl Bromide”, *ACS Catal.* **2017**, 7, 896-901.
3. Ling-Chao Yu, Ji-Wei Gu, Shu Zhang* and **Xingang Zhang,*** “Visible-Light-Promoted Tandem Difluoroalkylation-Amidation: Access to Difluorooxindoles from Free Anilines”, *J. Org. Chem.* **2017**, 82, 3943-3949.
4. Ji-Wei Gu, Qiao-Qiao Min, Ling-Chao Yu, and **Xingang Zhang,*** “Tandem Difluoroalkylation-Arylation of Enamides Catalyzed by Nickel” *Angew. Chem. Int. Ed.* **2016**, 55, 12270-12274.
5. Hai-Yang Zhao, Feng Zhang, Zhiji Luo, and **Xingang Zhang,*** “Carbonylation of Difluoroalkyl Bromides

- Catalyzed by Palladium” *Angew. Chem. Int. Ed.* **2016**, *55*, 10401-10405.
6. Yu-Lan Xiao, Qiao-Qiao Min, Chang Xu, Ruo-Wen Wang, and **Xingang Zhang**,* “Nickel-Catalyzed Difluoroalkylation of (Hetero)Arylborons with Unactivated 1-Bromo-1,1-difluoroalkanes” *Angew. Chem. Int. Ed.* **2016**, *55*, 5873-5841 (This paper was highlighted in *Synfacts* **2016**, *55*, 5837)
 7. Yan-Bo Yu, Zhi-Ji Luo, and **Xingang Zhang**,* “Copper-Catalyzed Direct Propargylation of Polyfluoroarenes with Secondary Propargyl Phosphates” *Org. Lett.* **2016**, *18*, 3302-3305.
 8. Bo Zhang and **Xingang Zhang**,* “Bronsted Acid Catalyzed gem-Difluoroallylation of Aldehydes with β -Tosyloxy- γ,γ -Difluoroallylboronic Acid Pinacol Ester” *Chin. J. Chem.* **2016**, *34*, 477-480 (Invited paper).
 9. Zhang Feng, Yu-Lan Xiao, and **Xingang Zhang**,* “Palladium-Catalyzed Phosphonyldifluoromethylation of Alkenes with Bromodifluoromethylphosphonate” *Org. Chem. Front.* **2016**, *3*, 466-469 (Invited paper as a 2015 Emerging Investigator).
 10. Zhang Feng, Qiao-Qiao Min, and **Xingang Zhang**,* “Access to Difluoromethylated Arenes by Pd-Catalyzed Reaction of Arylboronic Acids with Bromodifluoroacetate” *Org. Lett.* **2016**, *18*, 44-47.
 11. Bo Zhang and **Xingang Zhang**,* “Pd-Catalyzed gem-difluoroallylation of arylboronic acids with γ,γ -difluoroallylic acetates” *Chem. Commun.* **2016**, *52*, 1238-1241.
 12. Lun An, Yu-Lan Xiao, Qiao-Qiao Min, and **Xingang Zhang**,* “Facile Access to Fluoromethylated Arenes by Nickel-Catalyzed Cross-Coupling between Arylboronic Acids and Fluoromethyl Bromide” *Angew. Chem. Int. Ed.* **2015**, *54*, 9079-9083 (Hot paper, cover story. This paper was highlighted in *Synfacts* **2015**, *54*, 9079).
 13. Wen-Hao Guo, Qiao-Qiao Min, Ji-Wei Gu, and **Xingang Zhang**,* “Rhodium-Catalyzed ortho-Selective C-F Bond Borylation of Polyfluoroarenes with Bpin-Bpin” *Angew. Chem. Int. Ed.* **2015**, *54*, 9075.
 14. Zhang Feng, Qiao-Qiao Min, Hai-Yang Zhao, Ji-Wei Gu, and **Xingang Zhang**,* “A General Synthesis of Fluoroalkylated Alkenes by Palladium-Catalyzed Heck-Type Reaction of Fluoroalkyl Bromides” *Angew. Chem. Int. Ed.* **2015**, *54*, 1270.
 15. Xuefei Li, Zhang Feng, Zhong-Xing Jiang,* and **Xingang Zhang**,* “Nickel-Catalyzed Reductive Cross-Coupling of (Hetero)Aryl Iodides with Fluorinated Secondary Alkyl Bromides” *Org. Lett.* **2015**, *17*, 5570.
 16. Ji-Wei Gu and **Xingang Zhang**,* “Palladium-Catalyzed Difluoroalkylation of Isocyanides: Access to Difluoroalkylated Phenanthridine Derivatives” *Org. Lett.* **2015**, *17*, 5384 (This paper was highlighted in *Synfacts* **2016**, *12*, 242).
 17. Ji-Wei Gu, Wen-Hao Guo, and **Xingang Zhang**,* “Synthesis of diaryldifluoromethanes by Pd-catalyzed difluoroalkylation of arylboronic acids” *Org. Chem. Front.* **2015**, *2*, 38.
 18. Feng Zhang, Qiao-Qiao Min, and **Xingang Zhang**,* “Palladium-Catalyzed Heck-Type Difluoroalkylation of

- Alkenes with Functionalized Difluoromethyl Bromides” *Synthesis* **2015**, *47*, 2912-2923 (Invited paper, feature article)
19. Qiang Pan, Chun-Yang He, Shiqing Han,* and **Xingang Zhang**,* “Palladium-Catalyzed Direct Thienylation of Monobromide-Substituted Difluorinated Benzothiadiazoles for Organic Photovoltaics” *Synlett* **2015**, *26*, 2175-2179.
 20. Yulan Xiao, Qiang Pan, and **Xingang Zhang**,* “Nickel-Catalyzed Cross-Coupling of *gem*-Difluoropropargyl Bromide with Aryl Boronic Acids” *Acta Chim. Sinica* **2015**, *73*, 383-387 (Invited paper).
 21. Qiao-Qiao Min, Zengsheng Yin, Zhang Feng, Wen-Hao Guo, and **Xingang Zhang**,* “Highly Selective *gem*-Difluoroallylation of Organoborons with Bromodifluoromethylated Alkenes Catalyzed by Palladium” *J. Am. Chem. Soc.* **2014**, *136*, 1230.
 22. Yu-Lan Xiao, Wen-Hao Guo, Guo-Zhen He, Qiang Pan, and **Xingang Zhang**,* “Nickel-Catalyzed Cross-Coupling of Functionalized Difluoromethyl Bromides and Chlorides with Aryl Boronic Acids: A General Method for Difluoroalkylated Arenes” *Angew. Chem. Int. Ed.* **2014**, *53*, 9909 (This paper was highlighted by *Chemical & Engineering News* 2014, *92*, 25).
 23. Zhang Feng, Qiao-Qiao Min, Yu-Lan Xiao, Bo Zhang, and **Xingang Zhang**,* “Pd-Catalyzed Difluoroalkylation of Arylboronic Acids: A New Method for Aryldifluoromethylated Phosphonates and Carboxylic Acid Derivatives” *Angew. Chem., Int. Ed.* **2014**, *53*, 1669 (This paper was highlighted by *Chemical & Engineering News* 2014, *92*, 25).
 24. Yan-Bo Yu, Guo-Zhen He, and **Xingang Zhang**,* “Synthesis of α,α -Difluoromethylene Alkynes by Palladium-Catalyzed *gem*-Difluoropropargylation of Aryl and Alkenyl Boron Reagents” *Angew. Chem. Int. Ed.* **2014**, *53*, 10457 (This paper was highlighted in *Synfacts* **2014**, *10*, 1303).
 25. Chun-Yang He, Cai-Zhi Wu, Yan-Lin Zhu, and **Xingang Zhang**,* “Selective Thienylation of Fluorinated Benzothiadiazoles and Benzotriazoles for Organic Photovoltaics” *Chem. Sci.* **2014**, *5*, 1317 (Back Cover Story)
 26. Yu-Lan Xiao, Bo Zhang, Zhang Feng, and Xingang Zhang,* “Heteroaryldifluoromethylation of Organoborons Catalyzed by Palladium: Facile Access to Aryl(Heteroaryl)difluoromethanes” *Org. Lett.* **2014**, *16*, 4822.
 27. Yu-Lan Xiao, Bo Zhang, Chun-Yang He and **Xingang Zhang**,* “Direct Olefination of Fluorinated Benzothiadiazoles: A New Entry to Optoelectronic Materials” *Chem. Eur. J.* **2014**, *20*, 4532.
 28. Zhang Feng, Yu-Lan Xiao, and **Xingang Zhang**,* “Copper-Catalyzed Cross-Coupling of Bromozincdifluoromethylphosphonate with Iodo/Bromo-Aryl Triazines” *Org. Chem. Front.* **2014**, *1*, 113.
 29. Chun-Yang He, Cai-Zhi Wu, Feng-Ling Qing, and **Xingang Zhang**,* “Direct (Het)Arylation of Fluorinated Benzothiadiazoles and Benzotriazole with (Het)Aryl Iodides” *J. Org. Chem.* **2014**, *79*, 1712 (This paper was highlighted in *Synfacts*, **2014**, *10*, 0483).

30. Chun-Yang He, Feng-Ling Qing, and **Xingang Zhang**,* “Pd-Catalyzed Aerobic Direct Olefination of Polyfluoroarenes” *Tetrahedron Lett.* **2014**, *55*, 2962.
31. Yan-Bo Yu, Zhen Wang, and **Xingang Zhang**,* “Pd-catalyzed cross-coupling of polyfluoroarenes with cyclic vinyl triflates” *Sci. China Chem.* **2014**, *57*, 276 (Invited paper).
32. Zhao Chen, Chun-Yang He, Zengsheng Yin, Liye Chen, Yi He, and **Xingang Zhang**,* “Palladium-Catalyzed ortho-Selective C-F Activation of Polyfluoroarenes with Triethylsilane: A Facile Access to Partially Fluorinated Aromatics” *Angew. Chem. Int. Ed.* **2013**, *52*, 5813-5817 (This paper was highlighted in *Synfacts*, **2013**, *9*, 0878).
33. Chun-Yang He, Zhen Wang, Cai-Zhi Wu, Feng-Ling Qing, and **Xingang Zhang**,* “Pd-Catalyzed Oxidative Cross-Coupling between Two Electron Rich Heteroarenes” *Chem. Sci.* **2013**, *4*, 3508-3513.
34. Cai-Zhi Wu, Chun-Yang He, Yangen Huang, and **Xingang Zhang**,* “Thioether-Promoted Direct Olefination of Polyfluoroarenes Catalyzed by Palladium” *Org. Lett.* **2013**, *15*, 5266-5269 (This paper was highlighted in *Synfacts*, **2013**, *15*, 5266).
35. Chao Wang, Yan-Bo Yu, Shilu Fan, and **Xingang Zhang**,* “Pd-Catalyzed Direct Arylation of Nitro(pentafluorosulfanyl)benzenes with Aryl Bromides” *Org. Lett.* **2013**, *15*, 5004-5007.
36. Gaochao Huang, Zengsheng Yin, and **Xingang Zhang**,* “Construction of Optically Active Quaternary Propargyl Amines by Highly Enantioselective Zinc/BINOL-Catalyzed Alkynylation of Ketoimines” *Chem. Eur. J.* **2013**, *19*, 11992-11998 (Inside Cover Story).
37. Yi He, Zhao Chen, Chun-Yang He, and **Xingang Zhang**,* “Nickel-Catalyzed ortho-Selective Hydrodefluorination of N-Containing Heterocycle-Polyfluoroarenes” *Chin. J. Chem.* **2013**, *31*, 873-877 (Invited paper).
38. Yan-Bo Yu, Shilu Fan, and **Xingang Zhang**,* “Copper- and Phosphine-Ligand Free Palladium-Catalyzed Direct Alkylation of Electron-Deficient Polyfluoroarenes with Allylic Chlorides” *Chem. Eur. J.* **2012**, *18*, 14643-14648.
39. Shilu Fan, Zhao Chen, and **Xingang Zhang**,* “Copper-Catalyzed Dehydrogenative Cross-Coupling of Benzothiazoles with Thiazoles and Polyfluoroarenes” *Org. Lett.* **2012**, *14*, 4950-4953.
40. Zhang Feng, Fei Chen, and **Xingang Zhang**,* “Copper Catalyzed Cross-Coupling of Iodobenzoates with Bromozincdifluorophosphonate” *Org. Lett.* **2012**, *14*, 1938-1941 (This paper was highlighted in *Synfacts*, **2012**, *8*, 0775).
41. Fei Chen, Qiao-Qiao Min, and **Xingang Zhang**,* “Pd-Catalyzed Direct Arylation of Polyfluoroarenes on Water under Mild Conditions Using PPh₃ Ligand” *J. Org. Chem.* **2012**, *77*, 2992-2998.
42. Fei Chen, Zhang Feng, Chun-Yang He, Hao-Yang Wang, Yin-long Guo, and **Xingang Zhang**,* “Pd-Catalyzed Dehydrogenative Cross-Coupling of Polyfluoroarenes with Heteroatom-Substituted Enones” *Org. Lett.* **2012**, *14*, 1176-1179.