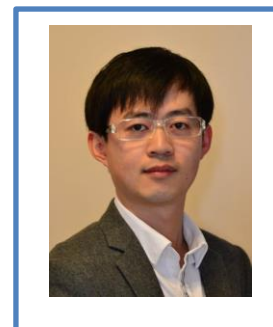


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Education

2012 PhD, Shanghai Institute of Organic Chemistry, CAS
2007 BS, Shanghai Jiao Tong University

Academic Careers

2015 Associate Professor, Shanghai Institute of Organic Chemistry, CAS
2012 Assistant Professor, Shanghai Institute of Organic Chemistry, CAS

Awards

2018 Membership of the Chinese Association of Young Scientists and Technologists
2018 Supported by Shanghai Rising-Star Program (Class A)
2017 Membership of Youth Innovation Promotion Association, Chinese Academy of Sciences
2017 Second-Class National Natural Science Award (New Strategies for Stereo- and Enantioselective Direct Transformations of Aromatic Compounds. The 3rd Contributor)
2016 First-Class Shanghai Natural Science Award (New Strategies for Stereo- and Enantioselective Direct Transformations of Aromatic Compounds. The 3rd Contributor)

Representative Publications

1. Xia, Z.-L.; Zheng, C.*; Liang, X.-W.; Cai, Y.; You, S.-L.* The Manipulation of Spiroindolenine Intermediates for Enantioselective Synthesis of 3-(Indol-3-yl)-pyrrolidines. *Angew. Chem., Int. Ed.* **2019**, *58*, 1158-1162.
2. Zheng, C.*; Xia, Z.-L.; You, S.-L.* Unified Mechanistic Understandings of Pictet–Spengler Reactions. *Chem* **2018**, *4*, 1952-1966.
3. Xia, Z.-L.; Zheng, C.*; Wang, S.-G.; You, S.-L.* Catalytic Asymmetric Dearomatization of Indolyl Dihydropyridines via Enamine Isomerization/Spirocyclization/Transfer Hydrogenation Sequence. *Angew. Chem., Int. Ed.* **2018**, *57*, 2653-2656.
4. Wang, Y.; Zheng, C.*; You, S.-L.* Ir-Catalyzed Asymmetric Allylic Dearomatization via a Desymmetrization Strategy. *Angew. Chem., Int. Ed.* **2017**, *56*, 15093-15097.
5. Wu, Q.-F.; Zheng, C.*; Zhuo, C.-X.; You, S.-L.* Highly Efficient Synthesis and Stereoselective Migration Reactions of Chiral Five-Membered Aza-Spiroindolenines: Scope and Mechanistic Understanding. *Chem. Sci.* **2016**, *7*, 4453-4459.
6. Zheng, C.*; Zhuo, C.-X.; You, S.-L.* Mechanistic Insights into the Pd-Catalyzed Intermolecular Asymmetric Allylic Dearomatization of Multisubstituted Pyrroles: Understanding the Remarkable Regio- and Enantioselectivity. *J. Am. Chem. Soc.* **2014**, *136*, 16251-16259.

Upgrading the Mechanistic Understanding of Pictet-Spengler Reactions

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Pictet–Spengler reactions are extensively utilized in the synthesis of various indole alkaloids. However, their mechanisms have been a controversial research topic.¹ In the past few years, we have developed a series of highly enantioselective syntheses of chiral spiroindolenines with multiple stereogenic centers *via* Ir-catalyzed asymmetric allylic dearomatization reactions, and the acid-catalyzed controllable ring-expansion migration of spiroindolenines.² Combined DFT calculations and direct molecular dynamics simulations provides deep understanding on the chemistry of spiroindolenines.³ The role of this species in Pictet–Spengler reactions is highly depended on the shape of the potential energy surface (PES). Particularly, the stereoselective migration of spiroindolenine to protonated tetrahydro- β -carboline can be achieved *via* dynamics effects. The new insights have been applied to a series of known catalytic asymmetric Pictet–Spengler reactions, leading to unified mechanistic understandings on this synthetically enabling reaction.

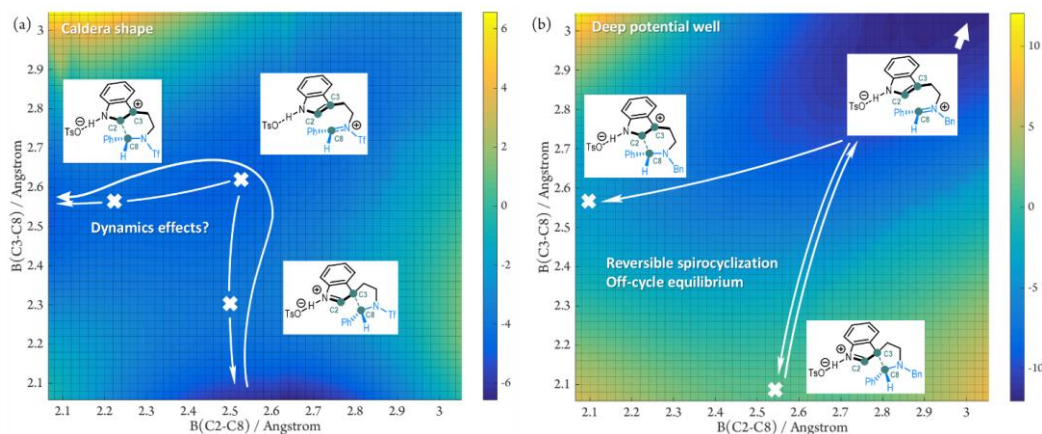


Fig. 1 Schematic potential energy surface of Pictet–Spengler reactions

References

1. Stöckigt, J.; Antonchick, A. P.; Wu, F.; Waldmann, H. *Angew. Chem., Int. Ed.* **2011**, *50*, 8538-8564.
2. (a) Zhuo, C.-X.; Zheng, C.; You, S.-L. *Acc. Chem. Res.* **2014**, *47*, 2558-2573. (b) Zheng, C.; You, S.-L. *Chem* **2016**, *1*, 830-857.
3. (a) Zheng, C.; Wu, Q.-F.; You, S.-L. *J. Org. Chem.* **2013**, *78*, 4357-4365. (b) Zheng, C.; Xia, Z.-L.; You, S.-L. *Chem* **2018**, *4*, 1952-1966.