



2020「中技社科技獎學金」

2020 CTCI Foundation Science and Technology Scholarship

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NTHU

Coinage Metal Catalyzed Divergent Transformations for the Synthesis of Highly Functionalized Organic Frameworks

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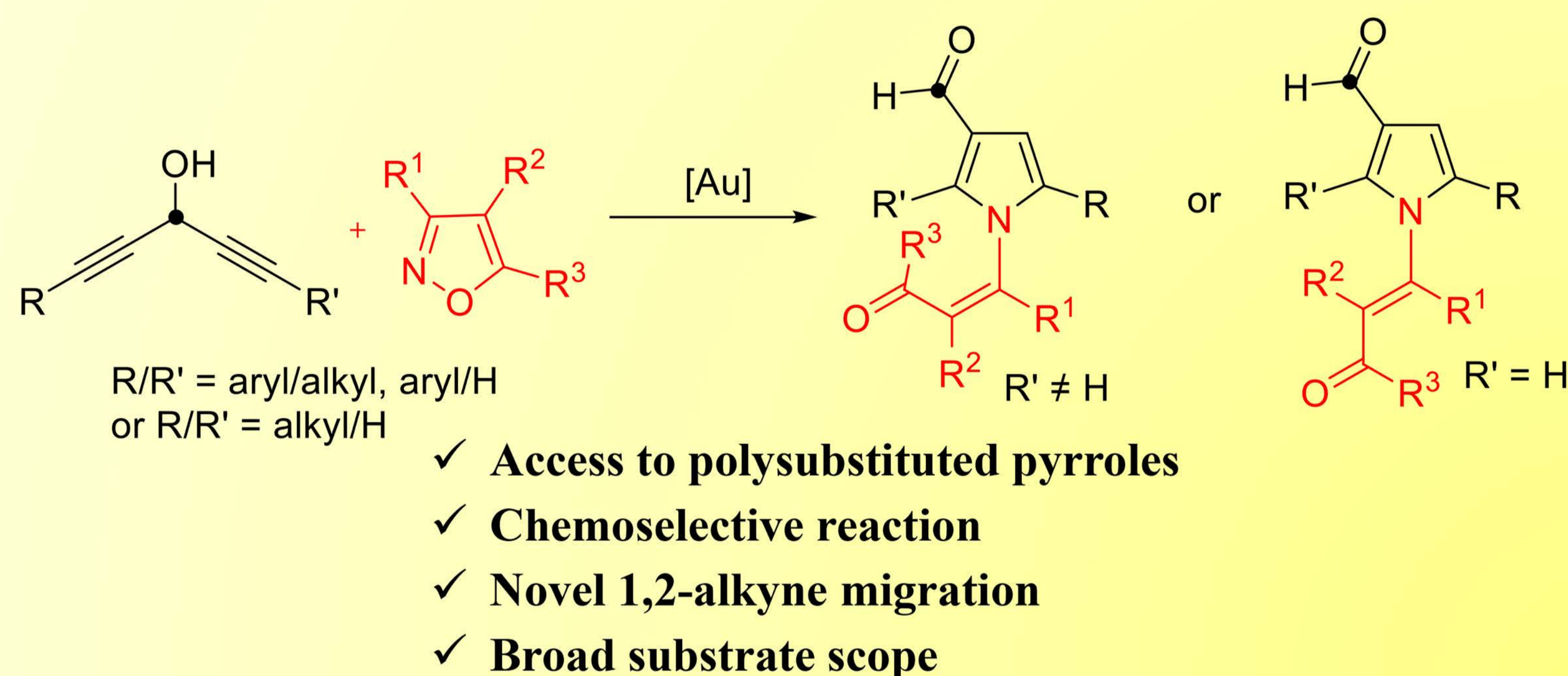


Abstract

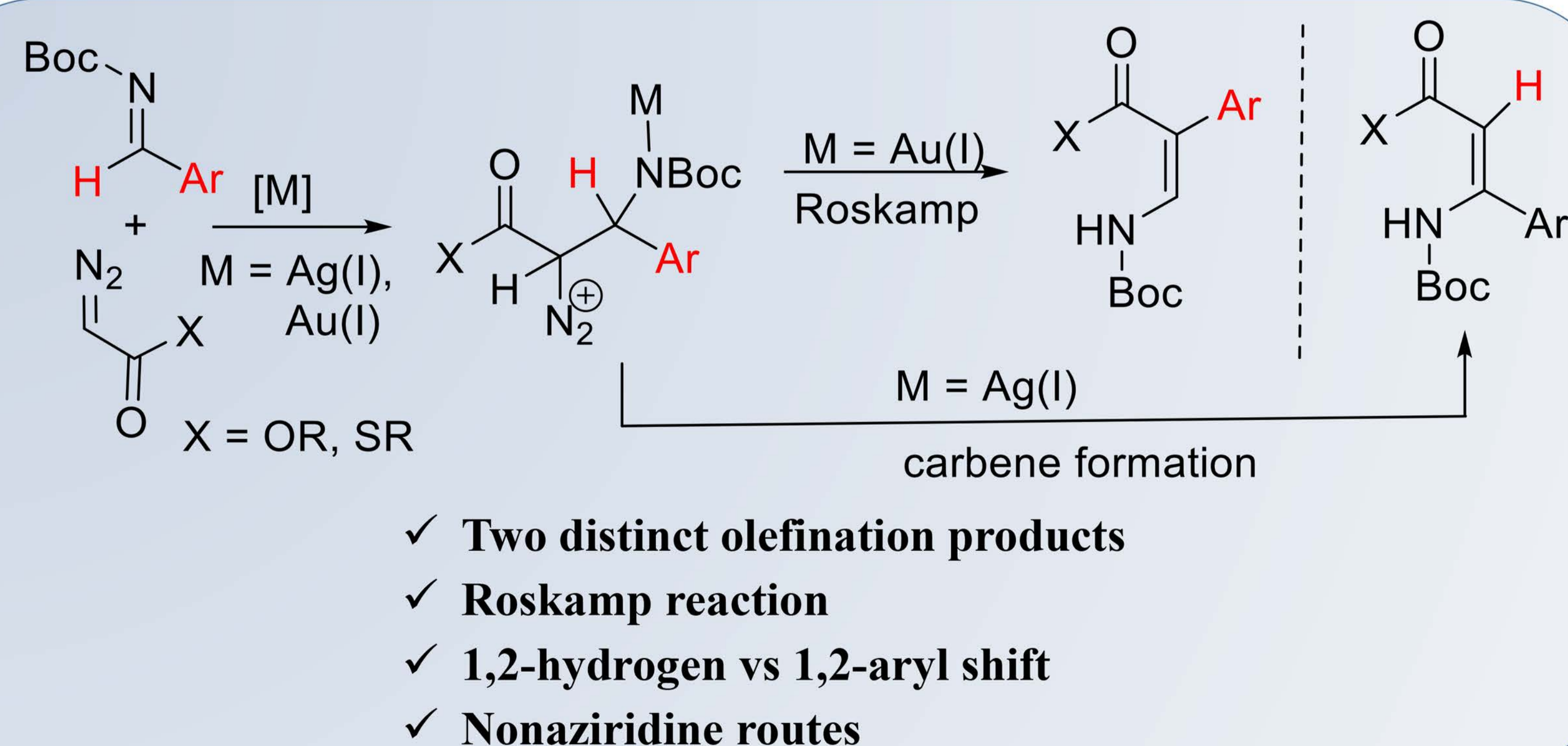
We have developed gold or silver catalyzed new synthetic strategies for various organic compounds such as polysubstituted pyrroles, β -amino acrylates, epoxybenzoazepine and heteroaryl-substituted nonsymmetrical triarylmethanes. These catalytic reactions involve formation of new C-C and C-N bonds. These catalytic olefinations or annulations enables easy, atom economic and convenient synthesis of heterocycles using mild reaction conditions and easy preparation of starting materials.

Research Work

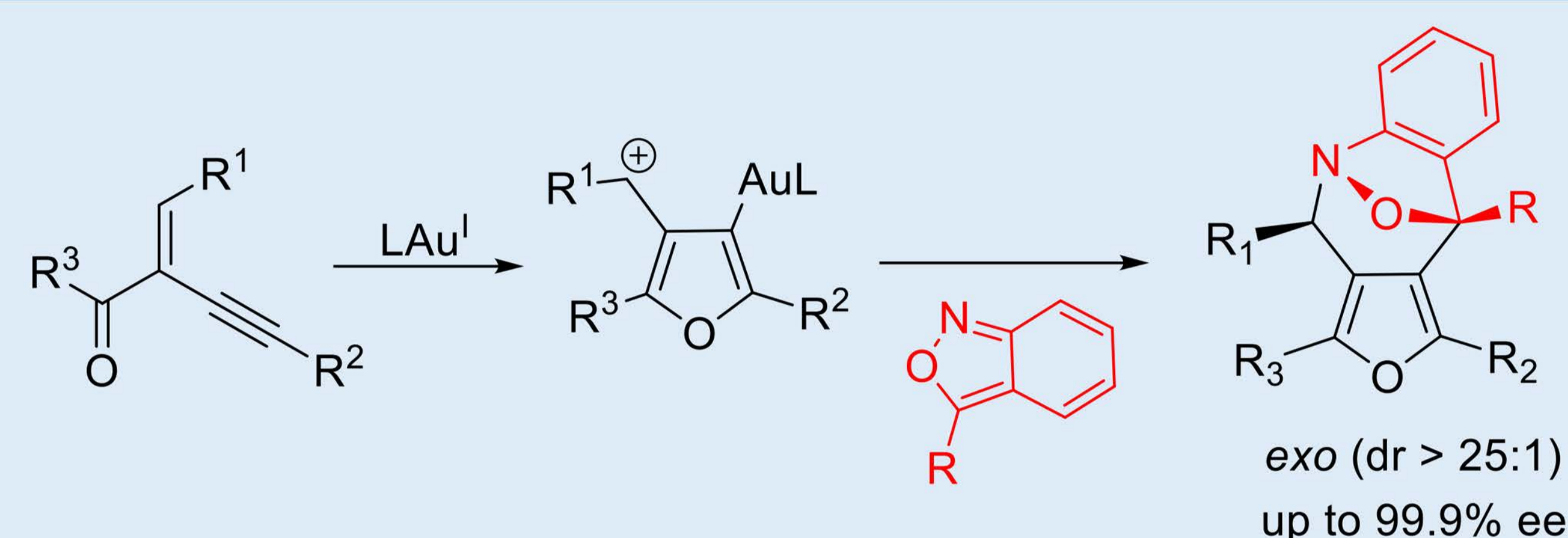
1. Gold-catalyzed (4+1)-Annulation Reactions between 1,4-Diyn-3-ols and Isoxazoles to Construct a Pyrrole Core



2. Two Distinct Ag(I)- and Au(I)-Catalyzed Olefinations between α -Diazo Esters and N-Boc-derived Imines

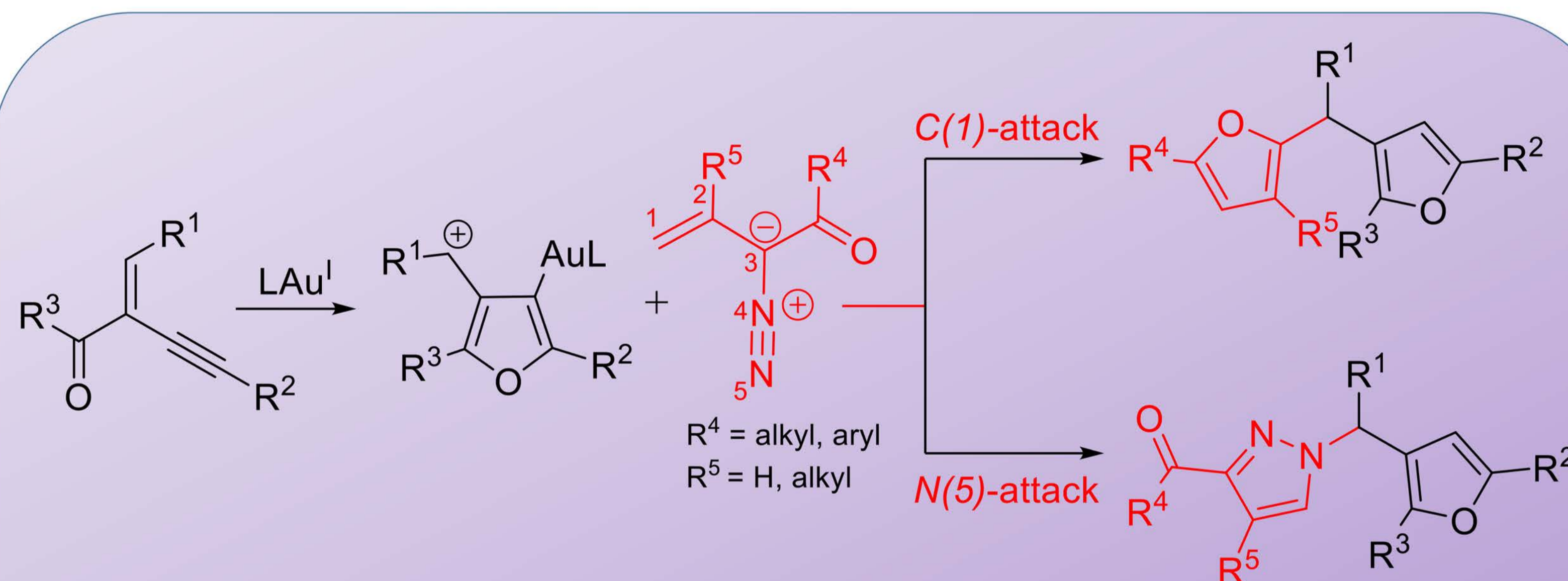


3. Gold(I)-Catalyzed Highly Diastereo- and Enantioselective Cyclization/[4+3] Annulation Cascades between 2-(1-Alkynyl)-2-alken-1-ones and Anthranils



- ✓ Access to biologically important benzazepine products
- ✓ Excellent *exo*-diastereoselectivity ($dr > 25:1$)
- ✓ Enantioselective versions have been developed
- ✓ First successful use of anthranil in asymmetric gold-catalysis

4. Gold(I)-catalyzed Reactions between 2-(1-Alkynyl)-2-alken-1-ones and Vinyldiazo Ketones for Divergent Synthesis of Nonsymmetric Heteroaryl-substituted Triarylmethanes: N- versus C-attack Paths



- ✓ Access to nonsymmetric heteroaryl-substituted TRAMs
- ✓ Vinyldiazo ketone as a heteroaryl units
- ✓ C(1)-attack yields furyl unit
- ✓ N(5)-attack yields pyrazolyl unit

References

- 1) **R. D. Kardile**, B. S. Kale, P. Sharma, R.-S. Liu, *Org. Lett.*, 2018, 20, 3806–3809.
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- 3) **R. D. Kardile**, T.-H. Chao, M.-J. Cheng, R.-S. Liu, *Angew. Chem., Int. Ed.* 2020, 59, 10396–10400.
- 4) **R. D. Kardile**, R.-S. Liu, *Org. Lett.*, 2020, 22, 8229–8233.

Acknowledgment

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