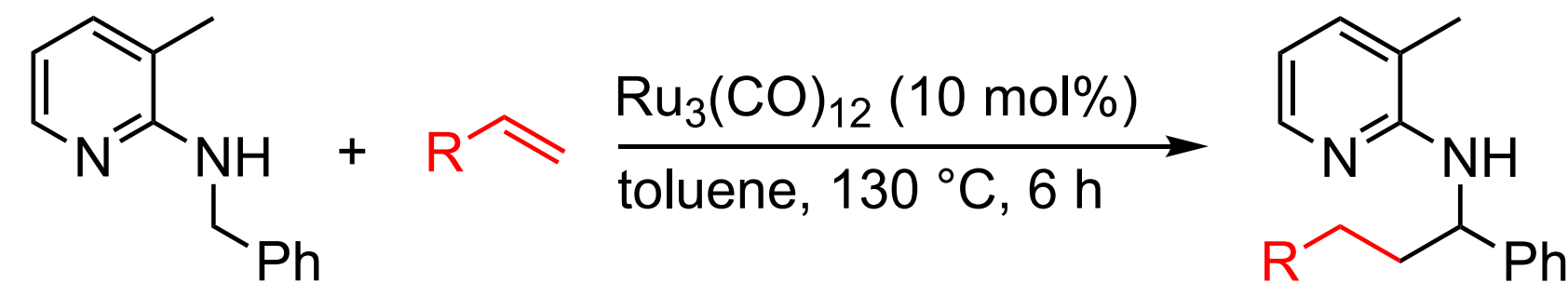


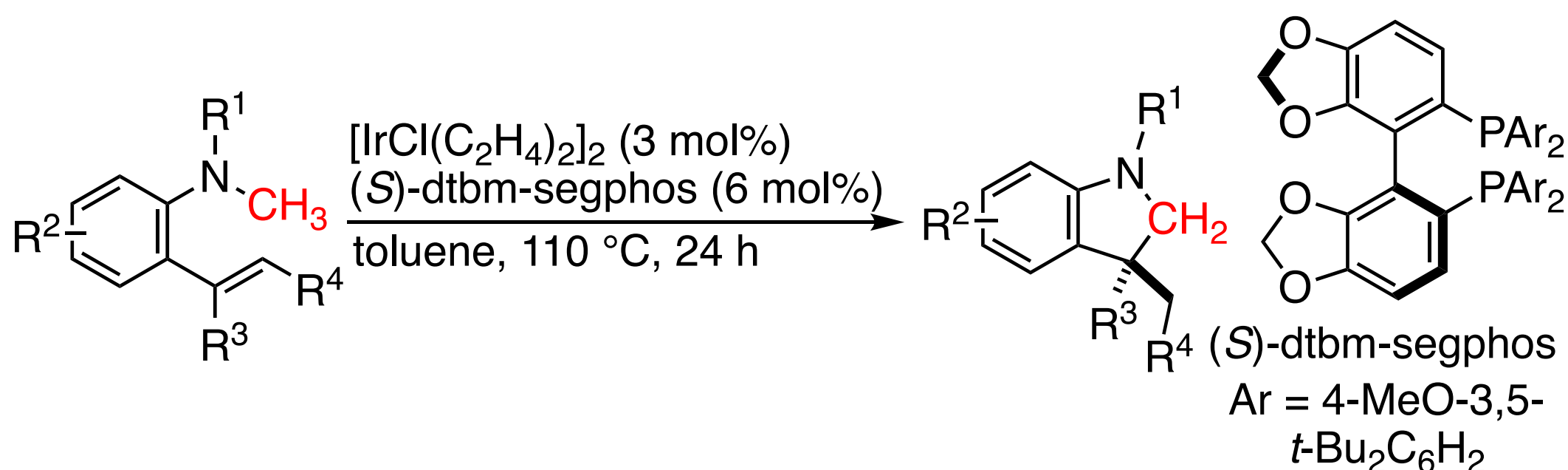
① Transition-Metal-Catalyzed Direct C-H Activation

Ruthenium-Catalyzed sp<sup>3</sup> C-H Alkylation of Benzylamine Derivatives



C.-H. Jun, D.-C. Hwang, S.-J. Na, *Chem. Commun.* **1998**, 1405.

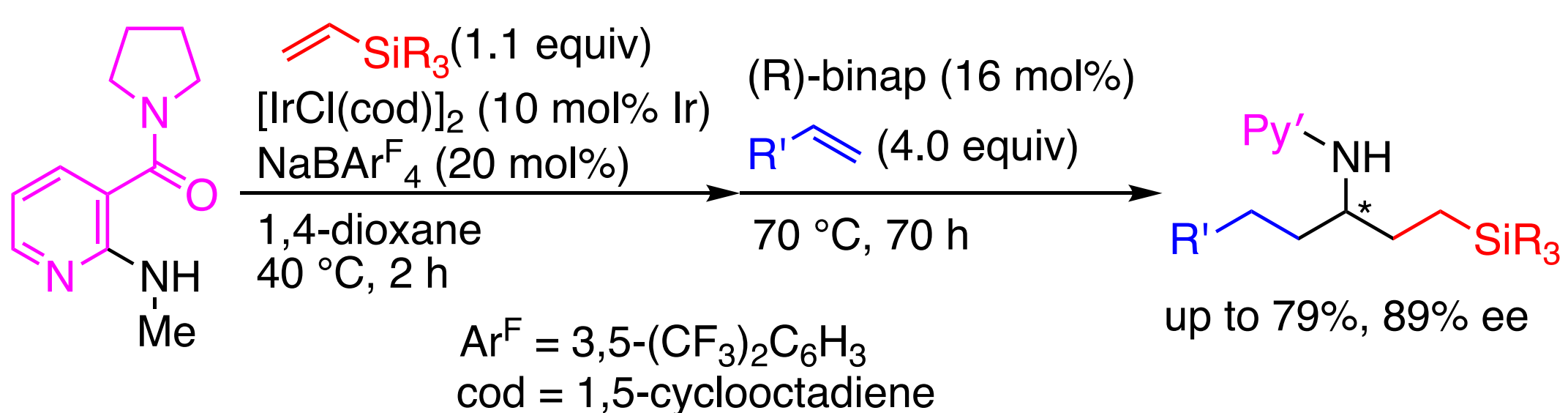
Iridium-Catalyzed Intramolecular Cyclization via sp<sup>3</sup> C-H Alkylation



T. Torigoe, T. Ohmura, M. Suginome, *Angew. Chem., Int. Ed.* **2017**, *56*, 14272.

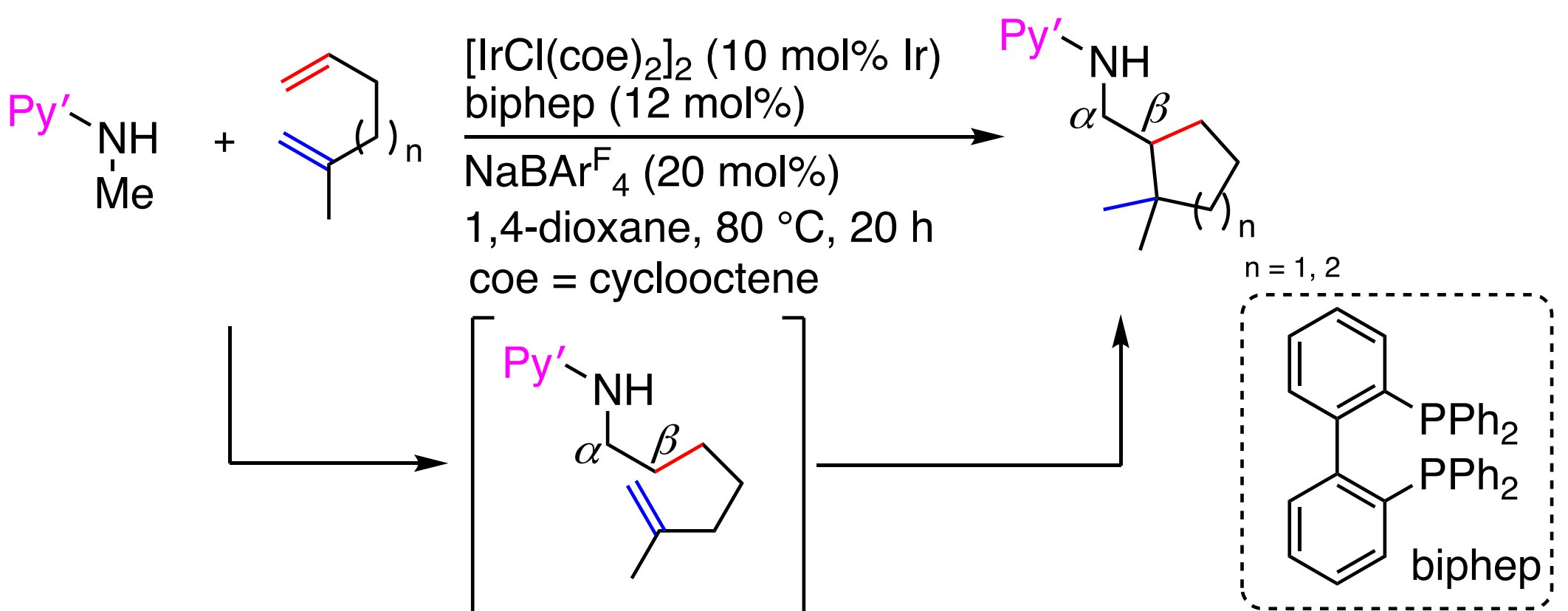
② Our Previous Work

Iridium-Catalyzed Sequential sp<sup>3</sup> C-H Alkylation of *N*-Methyl Group



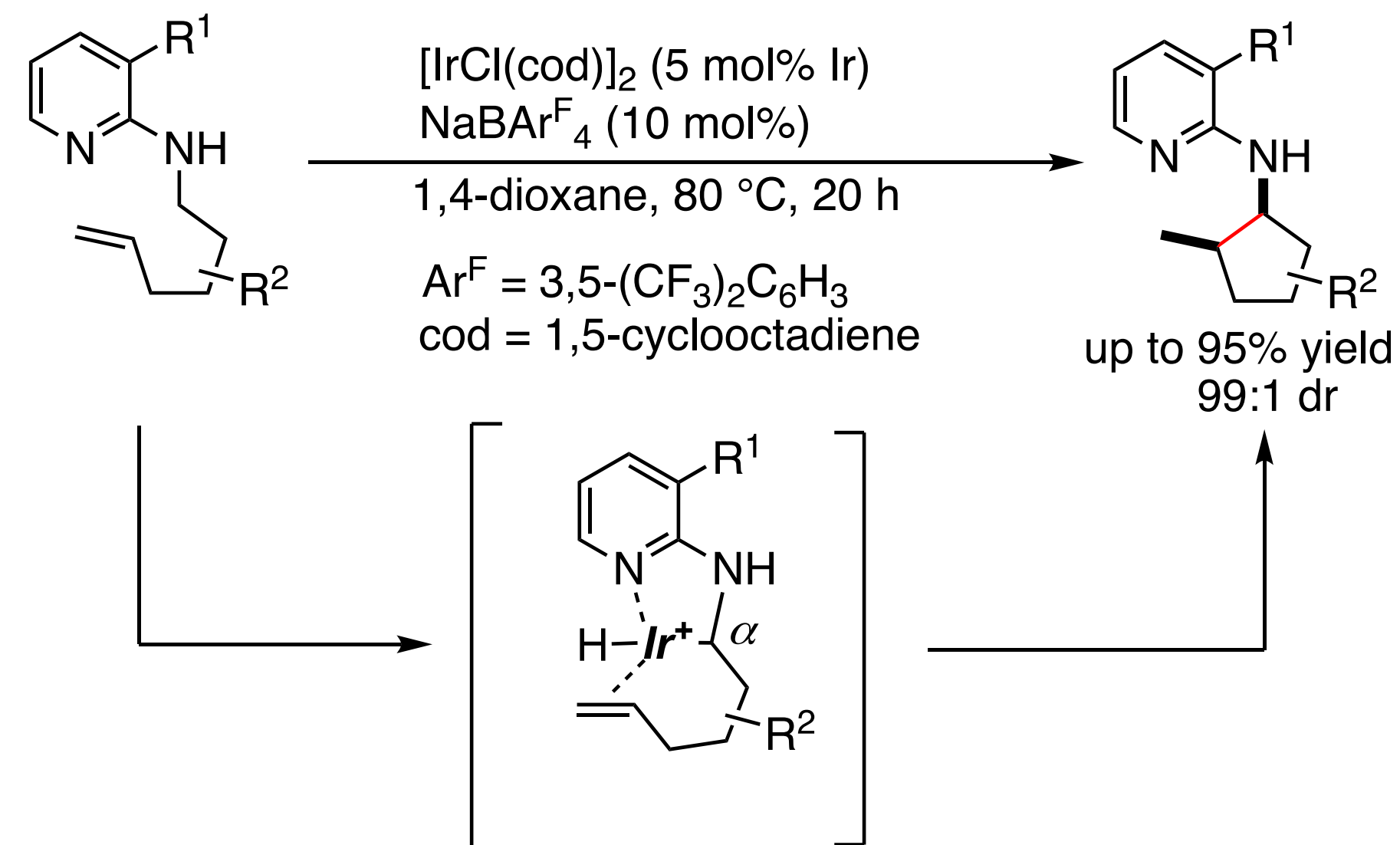
H. Hattori, T. Nishimura, *Adv. Synth. Catal.* **2018**, *360*, 4827.

Iridium-Catalyzed Cyclization of *N*-Methyl Group with Dienes



K. Tanaka, H. Hattori, R. Yabe, T. Nishimura, *Chem. Commun.* **2022**, *58*, 5371.

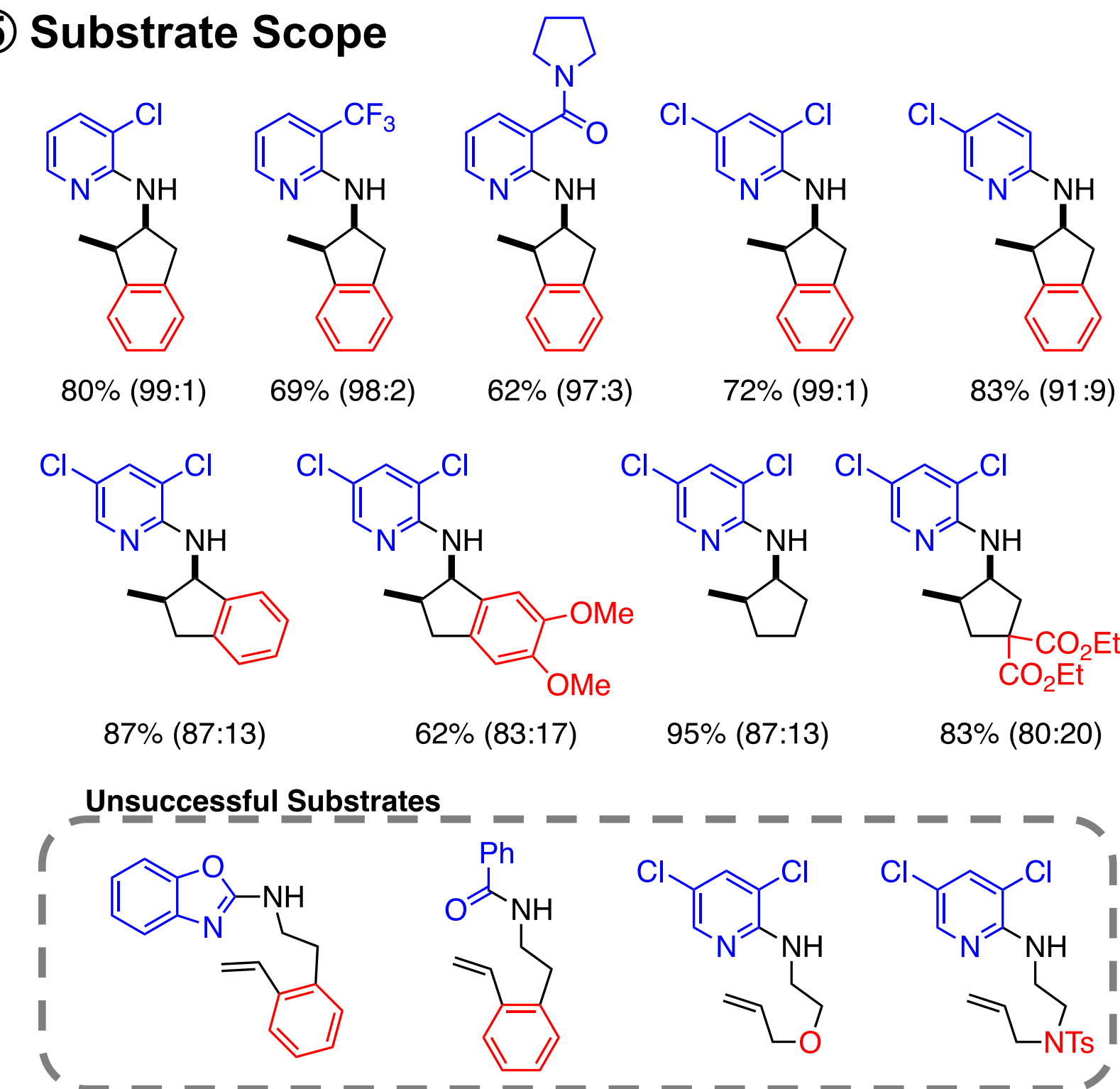
③ This Work



④ Optimization of Reaction Conditions

catalyst	solvent	NMR yield	cis:trans
[IrCl(cod)] <sub>2</sub>	1,4-dioxane	93%	99:1
[IrCl(cod)] <sub>2</sub>	toluene	75%	94:6
[IrCl(cod)] <sub>2</sub>	ClCH <sub>2</sub> CH <sub>2</sub> Cl	81%	93:7
[IrCl(cod)] <sub>2</sub> without NaBARF <sub>4</sub>	1,4-dioxane	0%	
[IrCl(coe) <sub>2</sub> ] <sub>2</sub>	1,4-dioxane	0%	
[RhCl(cod)] <sub>2</sub>	1,4-dioxane	26%	95:5

⑤ Substrate Scope



⑥ Proposed Catalytic Cycle

