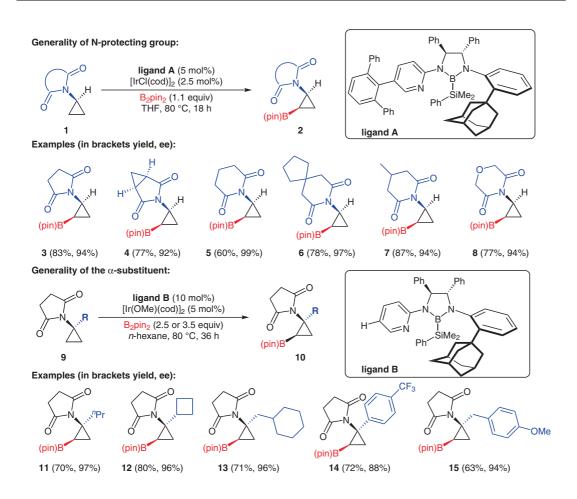
Y. SHI, Y. YANG, S. XU* (LANZHOU INSTITUTE OF CHEMICAL PHYSICS, UNIVERSITY OF CHINESE ACADEMY OF SCIENCES, BEIJING, AND HANGZHOU NORMAL UNIVERSITY, P. R. OF CHINA)

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Efficient Functionalization of Aminocyclopropanes



Significance: A judicious choice of both liqand and directing group (DG) plays an important role in the reactivity, regioselectivity, and stereoselectivity of a C-H functionalization reaction, with the cyclometalation typically dictating the observed regioselectivity. Whereas five-membered metallacycles are common, examples of asymmetric C-H functionalizations involving four- or six-membered rings are rare. The current report describes a method for the C-H borylation of aminocyclopropanes 1 and the identification of a suitable DG for achieving selective C-H borylation while avoiding competing σ -bond hydroboration.

Comment: Several potential DGs were evaluated with the succinimide 3 leading to selective borylation of the vicinal C(sp³)–H bond under iridium-catalyzed conditions, albeit with only 9% ee. Optimization of the ligand by increasing the steric bulk of the ortho substituent on the N-aryl ring led to significantly enhanced enantioselectivities, whereas tuning of the pyridine C5 substituent permitted a range of both N-protecting groups (3-8) and α -substituents (11–15) to be tolerated in the process. A gram-scale preparation and several synthetic applications of the products are demonstrated through both manipulation of the DG and crosscoupling of the BPin moiety.

SYNFACTS Contributors: Paul Richardson, Carmen Irizarry-Garcia (Pfizer)

Synthesis of Heterocycles

Key words

C-H bond activation boronate esters iridium catalysis cyclopropylamines succinimides

