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Synthetic Organic Chemistry Insisting on Original Intention

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We are working in the field of synthetic organic chemistry, which is insisting on original intention. Our studies on molecular catalysts have a history of over ten years and still lead us to unexpected and delightful discovery. Conjugate addition reaction of organocopper reagents was the starting point of our studies. The concept of a ligand design is a metal differentiating coordination that enables metal selective coordination of phosphorus and carbonyl oxygen atoms of the ligands with copper and other metal of the organocopper species. Steric modification is the second generation of the amidophosphane ligand that lead us to the efficient catalytic asymmetric conjugate addition of organocopper reagents, generated from organolithium and Grignard reagents, to enones as well as 1,2-addition of organozinc-derived copper reagents to imines. Although the first generation of an amidophosphane is effective in the rhodium(I)-catalyzed asymmetric conjugate arylation of arylboronic acids with enones, amino acid-connected amidophosphane, the third generation, opened the way to rhodium(I)-catalyzed asymmetric 1,2-arylation of arylboroxines with imines. The dipeptide-connected fourth generation of amidophosphane is the recent discovery that gave the copper-catalyzed asymmetric conjugate addition of organozinc reagents to enones. Application of these asymmetric reactions to kinetic resolution as well as asymmetric reaction of racemic cyclohexenones is the current focus of our studies.