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Catalytic Asymmetric α -C(sp³)-H Addition of Benzylamines to Aldehydes

Nat. Catal. 2022, 5, 1061–1068, DOI: 10.1038/s41929-022-00875-3.

Chiral Pyridoxal–Gold Rush in Asymmetric Carbonyl Catalysis

Category

Organo- and Biocatalysis

Key words

biomimetic catalysis

C–H functionalization

carbonyl catalysis

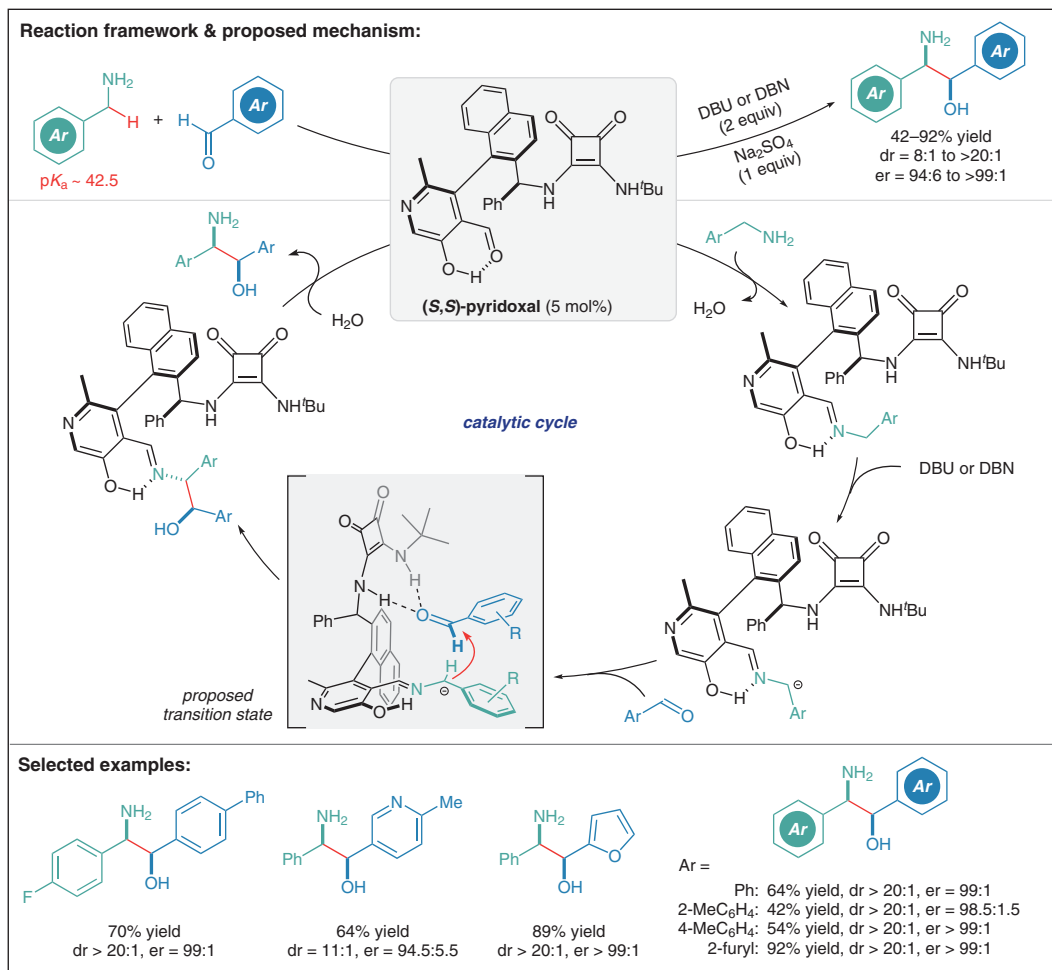
chiral pyridoxal

β -aminoalcohols

benzylamines

squaramide

Synfact
of the
Month



Significance: Although previously reported by Zhao et al. (*Angew. Chem. Int. Ed.* 2022, 61, e202206111), an evolving enantioselective version of activating the C(sp³)-H bond of free NH₂ benzylamines is developed. Using a squaramide-modified chiral pyridoxal catalyst, the organocatalytic asymmetric α -C–H addition of benzylamines to aldehydes provided access to chiral *syn*- β -aminoalcohols in moderate to high yields with excellent diastereo- and enantioselectivities.

Comment: One of the big challenges in the pyridoxal catalysis is the control of stereoselectivity. The squaramide moiety, introduced in the side chain of the pyridoxal catalyst, both activates and orients the electrophilic aldehyde through hydrogen bonding. As a kind of late bloomer, pyridoxal catalysis have been developed more slowly than other activation modes of organocatalysis but is now delivering amazing chemistry.

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Synfacts 2023, 19(03), 0289 Published online: 13.02.2023
DOI: 10.1055/s-0042-1753376; Reg-No.: B02423SF

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