Gallium(III) Triflate Catalyzed Diastereoselective Mukaiyama Aldol Reaction by Using Low Catalyst Loadings


Mukaiyama Aldol Reaction Catalyzed by Gallium(III) Triflate

Significance: The authors report a mild method for the diastereoselective Mukaiyama aldol reaction. The process is catalyzed by gallium(III) triflate yielding to the corresponding β-hydroxy ketones in up to 92% yield.

Comment: The developed method is an efficient aldol reaction under mild conditions with a very low catalyst loading of gallium(III) triflate (0.01–1.0 mol%). This is the first example of a metal triflate acting as a safe and stable slow-releasing source of triflic acid in the Mukaiyama aldol reaction. Gallium(III) triflate is a stable, easy-to-handle white solid.

Selected examples:

80% yield
syn/anti = 85:15
90% yield
syn/anti = 70:30
Ga(OTf)₃ (0.01 mol%)

76% yield
syn/anti = 18:82
56% yield
syn/anti = 87:13

66% yield
syn/anti = 82:18
46% yield
syn/anti = 96:4
75% yield
syn/anti = 66:34
70% yield
syn/anti = 69:31