

Massachusetts Institute of Technology
Organic Chemistry 5.512

April 11, 2005
Prof. Rick L. Danheiser

Unit 4
Stereocontrolled 1,2-Addition to Carbonyl Groups

- ★ Addition of "Unstabilized" Carbon Nucleophiles
- ★ Reagent Control: Organozinc and Related Addition Reactions
Alkyl, Alkenyl, and Alkynyl Metal Compounds

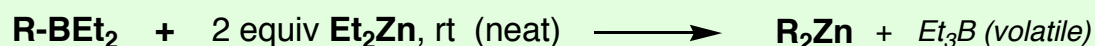
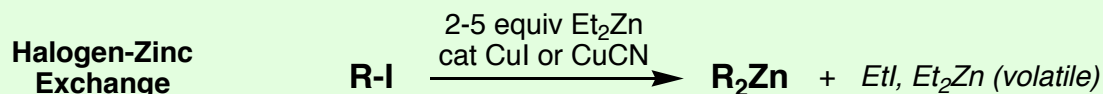
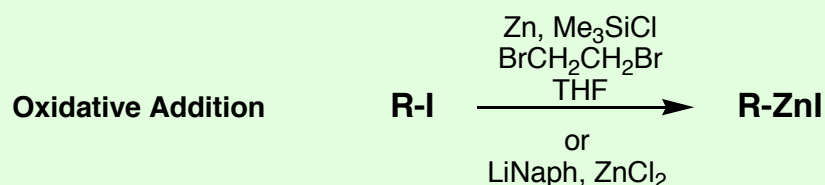
General Reviews on Organozinc Chemistry

"Preparation and Applications of Functionalized Organozinc Compounds"

Knochel, P.; Millot, N.; Rodriguez, A. L.; Tucker, C. E. *Organic Reactions* **2001**, 58, 417-731

"Organozinc Reagents: A Practical Approach" Knochel, P.; Jones, P.; Oxford, 1999

General Methods for the Preparation of Organozinc Compounds



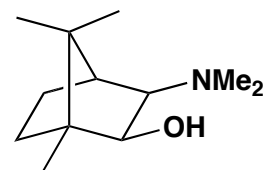
Asymmetric Addition of Dialkylzinc Compounds to Aldehydes

Review: "Catalytic Asymmetric Organozinc Additions to Carbonyl Compounds"

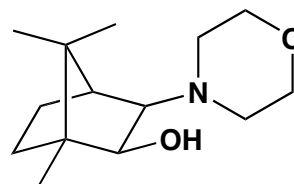
Pu, L.; Yu, H.-B. *Chem. Rev.* **2001**, *101*, 757



Ryoji Noyori in Stockholm (2001)



DAIB

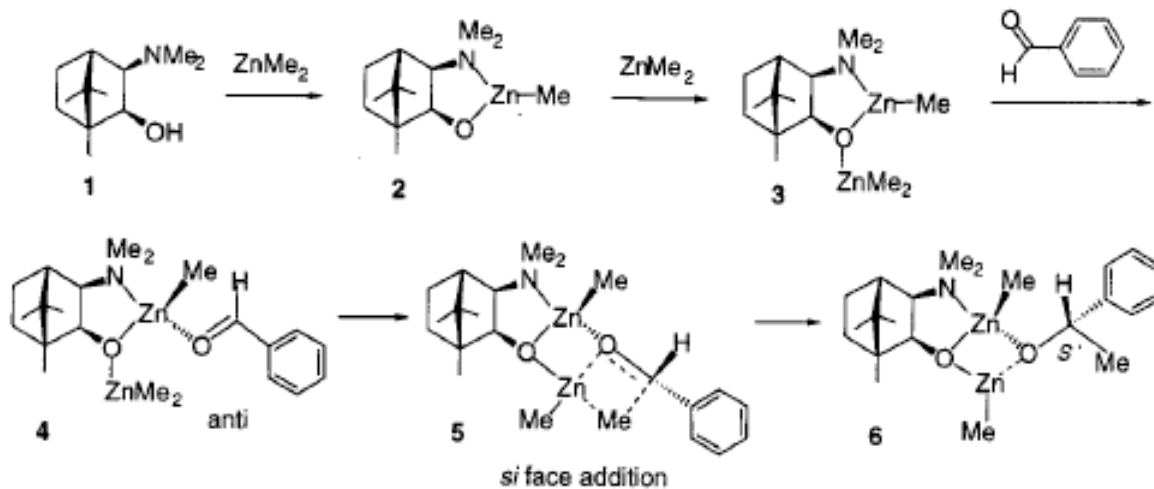


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W. A. Nugent

J. Chem. Soc., Chem. Commun. **1999**, 1369

Proposed Mechanism for the Catalytic Dimethylzinc Addition to Benzaldehyde

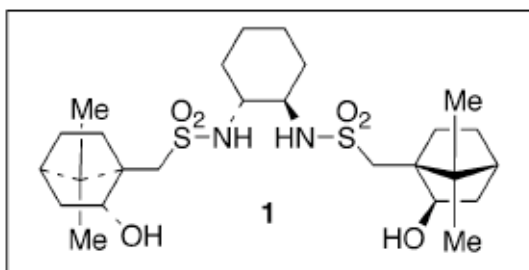


Asymmetric Addition of Alkenylmetal Compounds to Aldehydes

Asymmetric Vinylation of Ketones

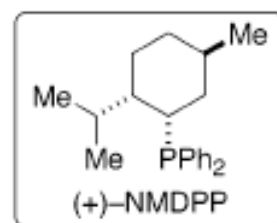
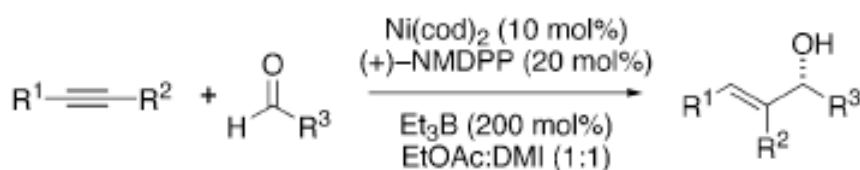
P. J. Walsh *J. Am. Chem. Soc.* **2004**, 126, 6538 and *J. Org. Chem.* **2005**, 70, 448

modified Yoshioka ligand



Jamison Vinylation

Miller, K. M.; Huang, W.-S.; Jamison, T. F. *J. Am. Chem. Soc.* **2003**, 125, 3442



J. D. Morrison ligand

Asymmetric Addition of Alkynylzinc Compounds to Aldehydes

Reviews: "Asymmetric Alkynylzinc Additions to Aldehydes and Ketones"

Pu, L. *Tetrahedron* **2003**, 59, 9873



Erick M. Carreira

