

# Atom Economic Asymmetric Aldol and Related Reactions

## Applications

- **Fine chemicals** - synthesis of chiral intermediates
- **Pharmaceutical synthesis** - natural products and small molecules
- **Agrichemical synthesis**

## Advantages

- **Versatile** -
  - Reaction works with a variety of ketones, nitroalkyls, carbonyls, and imines
  - Catalyst can be used for aldol, nitroaldol, and other reactions
- **Inexpensive** -
  - High atom economy of reaction
  - Low cost of chiral ligand
  - Catalyst utilizes low cost metal
- **Easy** - chiral ligand readily available
- **Non-toxic** metal in catalyst

## Publications

- B.M. Trost and H. Ito ["A Direct Catalytic Enantioselective Aldol Reaction via a Novel Catalyst Design,"](#) *J Am Chem Soc* 2000, 22, 12003-12004.
- Trost BM, Ito H, Silcoff Er. ["Asymmetric aldol reaction via a dinuclear zinc catalyst: alpha-hydroxyketones as donors"](#) *J Am Chem Soc.* 2001 Apr 11:123(14):3367-8.

- Trost BM, Silcoff ER, Ito H. ["Direct asymmetric aldol reactions of acetone using bimetallic zinc catalysts"](#) *Org Lett.* 2001 Aug 9;3(16):2497-500.
- Trost BM, Yeh VS. ["A dinuclear Zn catalyst for the asymmetric nitroaldol \(Henry\) reaction."](#) *Angew Chem Int Ed Engl.* 2002 Mar 1;41(5):861-3.
- Trost BM, Yeh VS, Ito H, Bremeyer N. ["Effect of ligand structure on the zinc-catalyzed Henry reaction: Asymmetric syntheses of \(-\)-denopamine and \(-\)-arbutamine."](#) *Org Lett.* 2002 Aug 8;4(16):2621-3.
- Trost BM, Yeh VS, ["Stereocontrolled synthesis of \(+\)-boronolide"](#) *Org Lett.* 2002 Oct 3;4(20):3213-6.
- Trost BM, Terrell LR. ["A direct catalytic asymmetric mannich-type reaction to syn-amino alcohols."](#) *J Am Chem Soc.* 2003 Jan 15;125(2):338-9.
- Trost BM, Fettes A, Shireman BT. ["Direct catalytic asymmetric aldol additions of methyl ynones. Spontaneous reversal in the sense of enantioinduction."](#) *J Am Chem Soc.* 2004 Mar 10;126(9):2660-1.
- Trost BM, Frederiksen MU, Papillon JP, Harrington PE, Shin S, Shireman BT. ["Dinuclear asymmetric Zn aldol additions: formal asymmetric synthesis of fostriecin."](#) *J Am Chem Soc.* 2005 Mar 23;127(11):3666-7.

## Patents

- Published Application: [WO200241984](#)
- Published Application: [20040019239](#)

## Innovators

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