

Lecture “Modern Synthetic Methods”

Take-home messages from Week 13

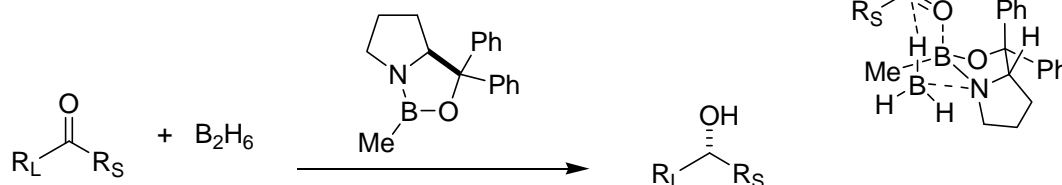
3.3.4. Double activation of both electrophile and nucleophile

Non-linear effects:

- No linear correlation between ee (catalyst) and ee (product)
- Can be positive or negative, also very complex relations have been observed
- Observation of non-linear effects is a very strong indicator for the presence of multinuclear, catalytically active species (with more than one chiral ligand)

Corey-Itsuno reduction:

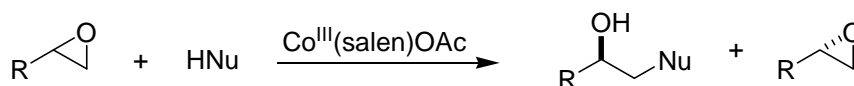
- Ligand allows regioselective binding of BH_3 at *N*-atom
- Electronic push-pull mechanism



Asymmetric epoxide opening:

Jacobsen:

- Double activation by two cobalt catalyst molecules
- Kinetic resolution of epoxides to diols or azido alcohols



Shibasaki:

- Double activation by two different metals (Ga , Li) coordinated by bis-BINOL derivative
- Desymmetrization of *meso*-epoxides to hydroxy-ethers

3.4. Metal-mediated redox-processes

Sharpless-epoxidation:

- For allylic alcohols only
- Bimetallic catalyst

