trans-Selective Hydroboration of Internal Alkynes Catalyzed by Ruthenium


**Comment:** Both control and deuterium-labelling experiments provide support for a true trans-selective hydroboration, rather than an isomerization process. The proposed mechanism involves an inner-sphere hydride delivery to furnish metallocyclopentene C, which can relieve steric congestion about the Cp* ring via isomerization to metallocyclopropene E. The reductive elimination places the boron atom anti to the hydrogen atom, providing access to the E-configured olefin. While the method is highly functional-group-tolerant, modest regioselectivity is observed with unsymmetrical alkynes.

**Selected examples:**

- 91% yield $EZ > 98:2$
- 89% yield $EZ = 97:3$
- 59% yield $EZ = 84:16$

**Proposed mechanism:**