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 metallocyclopentene 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, $E/Z = 98:2$
- 89% yield, $E/Z = 97:3$
- 59% yield, $E/Z = 84:16$

**Proposed mechanism:**

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SYNFACTS 2014, 10(3), 0267 Published online: 17.02.2014
DOI: 10.1055/s-0033-1340763; Reg-No.: L00614SF