Ruthenium-Catalyzed Z-Selective Cross-Metathesis of Allylic Alcohols

Significance: The authors describe a ruthenium complex catalyzed Z-selective cross-metathesis to afford (Z)-allylic alcohols. The reaction conditions are very mild and a wide range of functional groups (for example, aldehydes, carboxylic acids, phenols, and enol ethers) is tolerated.

Comment: Using a ruthenium–disulfide complex, highly valuable (Z)-alkenes are obtained from easily available alkenes and (Z)-allylic alcohols. Theoretical studies provide a better understanding of this catalyst design.

Selected examples:

- 4-(2-Propenyl)phenol (72% yield, Z/E = 96:4)
- 4-(2-(tert-Butyldimethylsilyl)vinyl)phenol (65% yield, Z/E = 93:7)
- 4-(2-(Benzyloxy)propyl)phenol (80% yield, Z/E = 98:2)
- 4-(2-Propynyl)phenol (68% yield, Z/E = 98:2)
- 4,5-Dihydroxy-2H-pyran (80% yield, Z/E = 94:6)
- 4-Isopropyl-2,5-dihydroxy-1-cyclopentene (70% yield, Z/E = 96:4)
- 2-(2-Methoxyacetamidomethyl)phenol (63% yield, Z/E = 92:8)
- 2-(2-Propynyl)phenol (54% yield, Z/E = 87:13)

Application to a formal total synthesis:

Neopeltolide (antitumor)

Leucascandrolide A (cytotoxic)