Ruthenium-Catalyzed Asymmetric Yne–Enone Cyclizations

Significance: The authors report asymmetric yne–enone cyclizations catalyzed by chiral cationic CpxRuII complexes. A variety of 4H-pyrans were obtained in good yields (≥95%) and high enantioselectivities (er ≤ 99:1).

Comment: A new class of chiral CpxRuII complexes was synthesized that provide opportunities for the development of synthetically valuable enantioselective transformations.

Synthesis of the chiral CpxRuII complexes:

1. TlOEt, C6H6, 80 °C then [(C6H5)RuCl2]2, MeCN, r.t. 21–77% yield
2. AgX 61–99% yield

Selected examples:

- 71% yield er = 97:3
- 87% yield er = 98.5:1.5
- 95% yield er = 89:11
- 78% yield er = 99:1
- 72% yield er = 98:2
- 95% yield er = 98:2