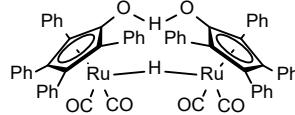


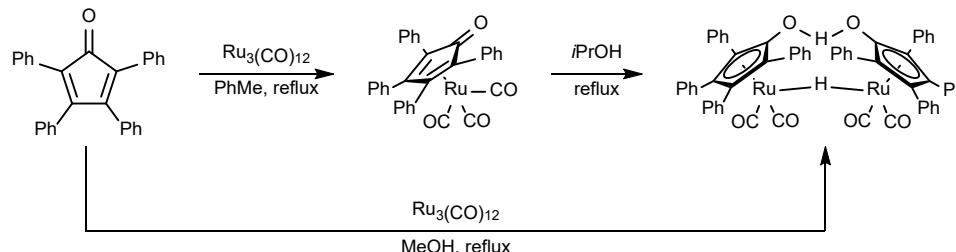
Shvo's catalyst



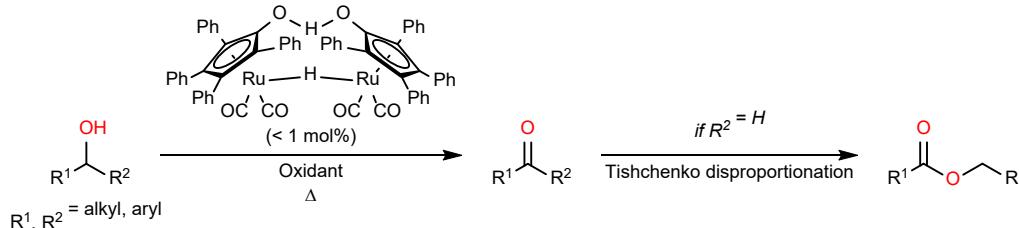
Conley, B. L.; Pennington-Boggio, M. K.; Boz, E.; Williams, T. J. *Chem. Rev.* **2010**, *110*, 2294–2312. <https://doi.org/10.1021/cr9003133>.

- First synthesized and studied by Youval Shvo in 1986.
- In general, it is a transfer hydrogenation catalyst for alcohol/ketones or amine/imines
- Detailed reactivity includes oxidation of alcohol/amine, reduction of ketone/imine, and coupling between alcohol and amine

Synthesis

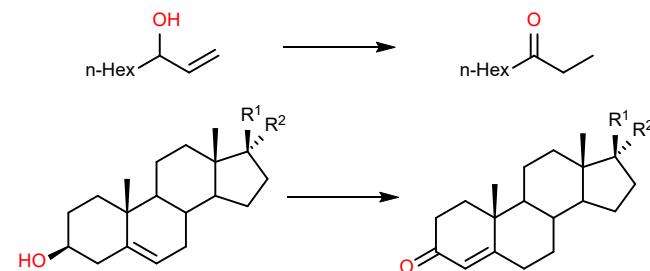


Reactivity: oxidation

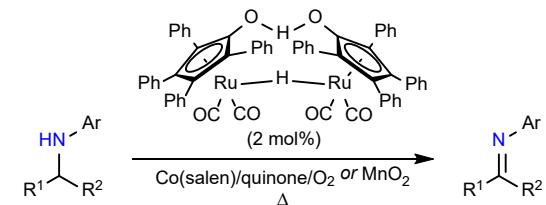


Oxidant	Side product
alkene/alkyne	alkane
acetone	iPrOH
chloroform/base	DCM
Co(salen)/quinone/O ₂	H ₂ O

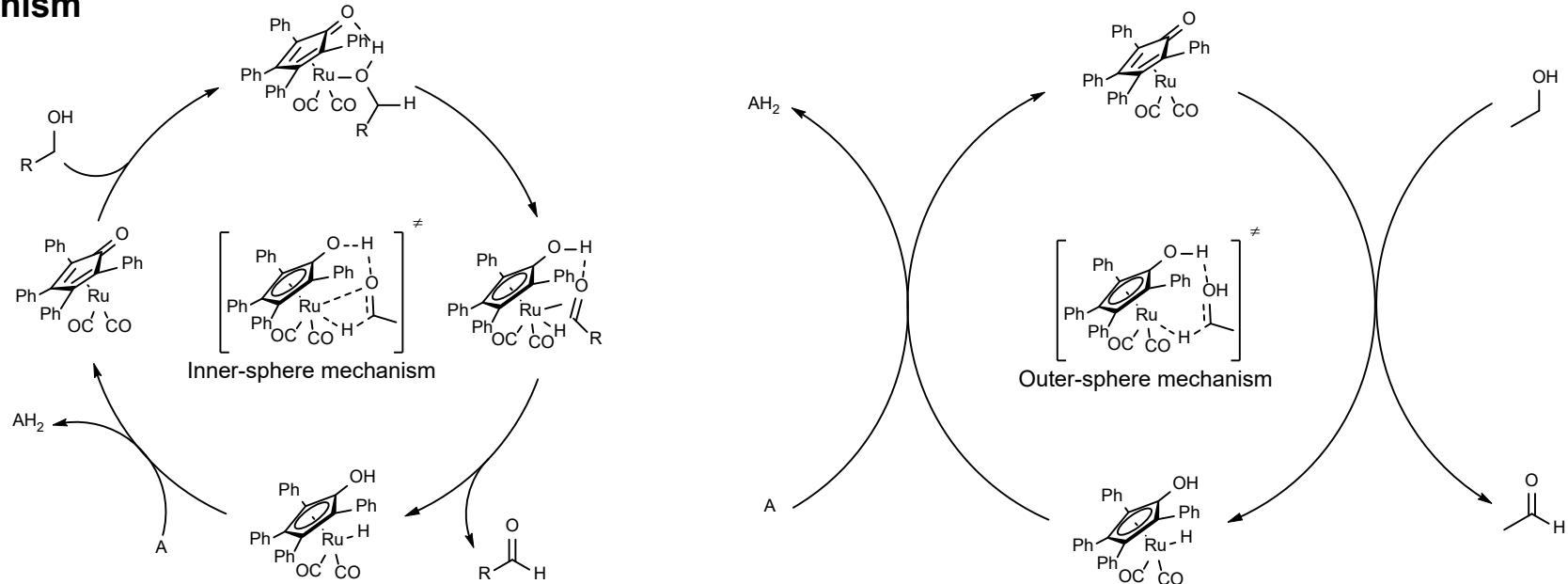
Special cases:



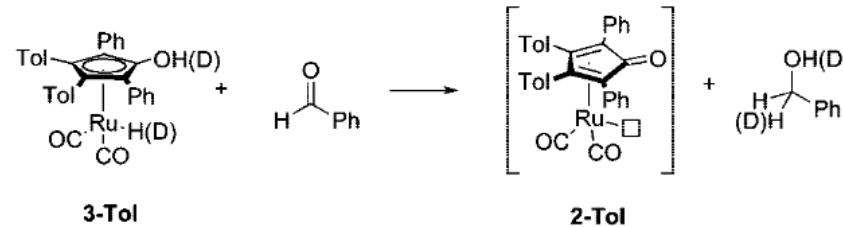
Amine oxidation



Mechanism

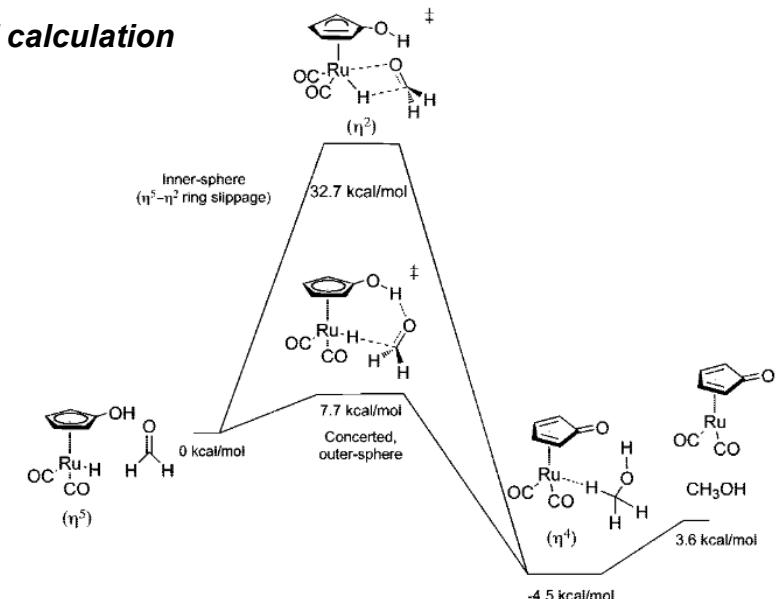


KIE experiments



entry	KIE	studied value
1	$k_{\text{OHRuH}}/k_{\text{OHRuD}}$	1.5(2)
2	$k_{\text{ODRuH}}/k_{\text{ODRuD}}$	1.6(2)
3	$k_{\text{OHRuH}}/k_{\text{ODRuH}}$	2.2(1)
4	$k_{\text{OHRuD}}/k_{\text{ODRuD}}$	2.3(4)
5	$k_{\text{OHRuH}}/k_{\text{OD/RuD}}$	3.6(3)

DFT calculation

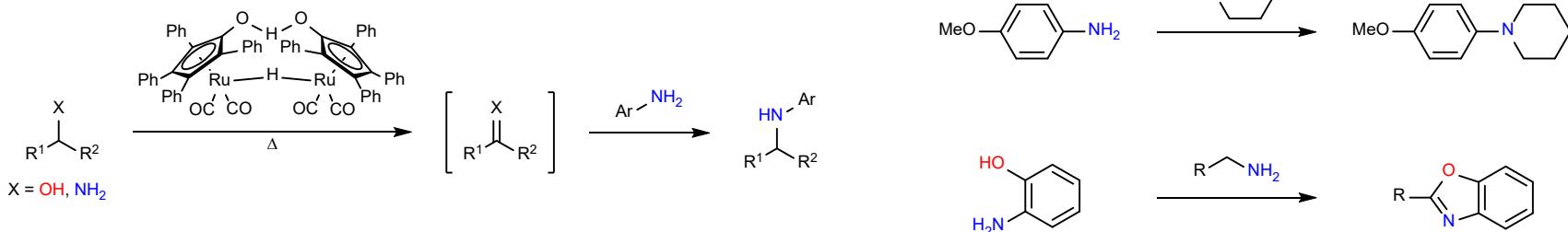


Shvo's catalyst

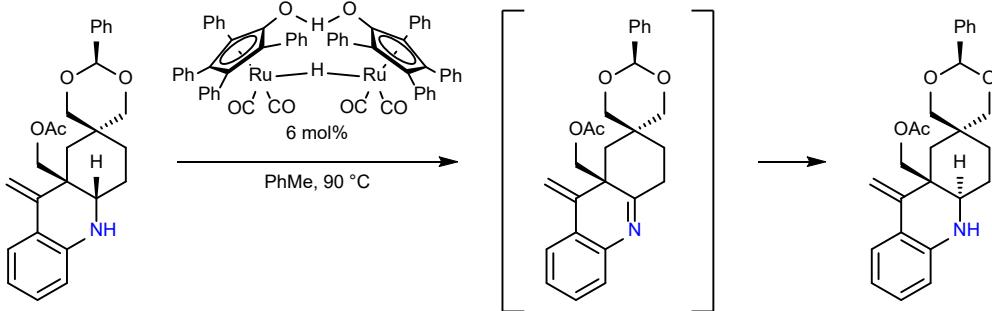
Reactivity: reduction



Reactivity: coupling



Synthetic application



Summary

- A useful transfer-hydrogenation catalyst for alcohol/amines
- Broad reactivity including oxidation/reduction/cross-coupling
- Low catalyst load, relatively mild conditions
- Sometimes requires high temperature