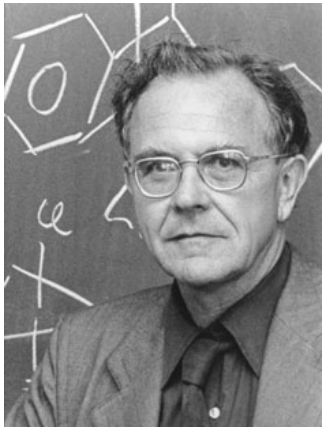
Day 10: Catalytic Hydrogenation

TODAY'S TOPICS

-General information
-Key historical developments
-Mechanisms
-Asymmetric catalysis

CHEMIST OF THE DAY



name?
known for?

QUOTE OF THE DAY

"Great things are not accomplished by those who yield to trends and fads and popular opinion."

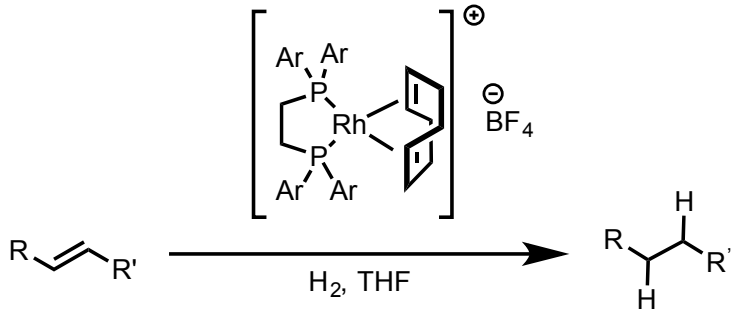
- Jack Kerouac

READING

Hartwig: Ch. 15
Crabtree: Ch. 9.2–9.3

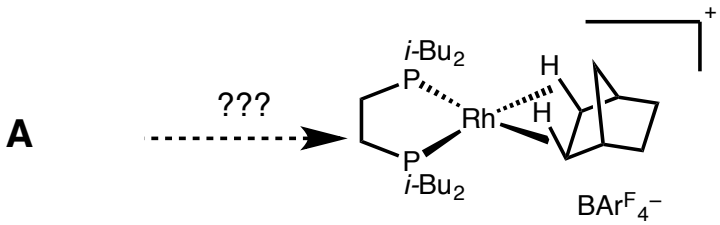
PROBLEMS OF THE DAY

#1 The Schrock–Osborn catalyst shown below is highly active for the hydrogenation of olefins. **Propose the active (on-cycle) catalyst in the transformation.**



#2 Consider the following σ-complex reported by Macgregor and Weller (*Science* **2012**, *337*, 1648).

A. Provide the oxidation state, d-electron count and overall electron count for the complex.



[X-ray]

B. Propose a plausible synthetic route to access this complex.

C. Provide the structure of $BAr^F{}_4^-$ (original report: *Bull. Chem Soc. Jpn.* **1984**, *57*, 2600).

#3 Wilkinson's catalyst, $(Ph_3P)_3RhCl$, effects the hydrogenation of terminal and internal olefins. In contrast the complex $(Ph_3P)_3Rh(CO)H$ is highly selective for hydrogenating terminal olefins exclusively. This complex can also promote alkene isomerization to convert terminal alkenes to internal alkenes. (*J. Chem. Soc. A* **1968**, 2665). **Explain these trends.**