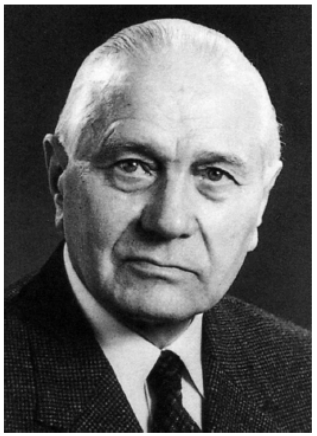
Day 11: Catalytic Carbonylation

TODAY'S TOPICS

-Monsanto acetic acid process
-Hydroformylation with cat. Co
-Hydroformylation with cat. Rh
-Hydroaminomethylation
-Hydrocarboxylation

CHEMIST OF THE DAY



name?
known for?

QUOTE OF THE DAY

"If you're going through hell, keep going."

- Winston Churchill

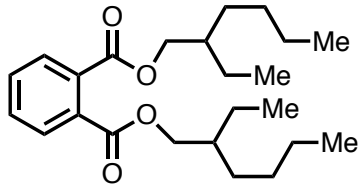
READING

Hartwig: Ch. 17
Crabtree: Ch. 9.4

PROBLEMS OF THE DAY

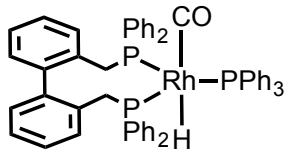
#1 The Monsanto acetic acid process invovles a key oxidative addition step of MeI to the rhodium catalyst. **Provide all possible mechanisms for this elementary step, and design a series of experiments to disambiguate between these possibilities.**

#2 Di(2-ethylhexyl)phthalate (DEHP or "dioctyl phthalate") is a plasticizer for polyvinyl chloride and is thus ubiquitous is modern society. **Propose a synthesis of DEHP from ≤ C3 and aromatic feedstocks.**

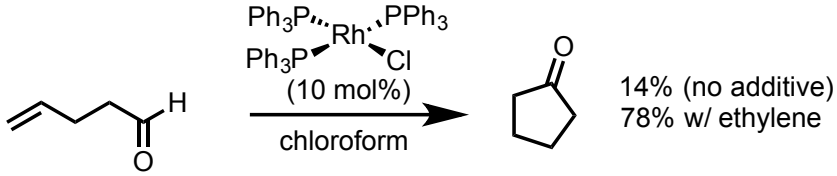


(DEHP)

#3 The following rhodium catalyst containing the bidentate BISBI ligand has been shown to give extremely high linear to branched ratios in hydroformylation reactions. **Explain the origin of this phenomenon and design one or more experiments to test your reasoning.**



#4 The following intramolecular hydroacylation reaction was found to provide higher yield when performed under an ethylene (1 atm) atmosphere. **Propose a mechanism for product formation that explains the role of the ethylene.**



14% (no additive)
78% w/ ethylene