

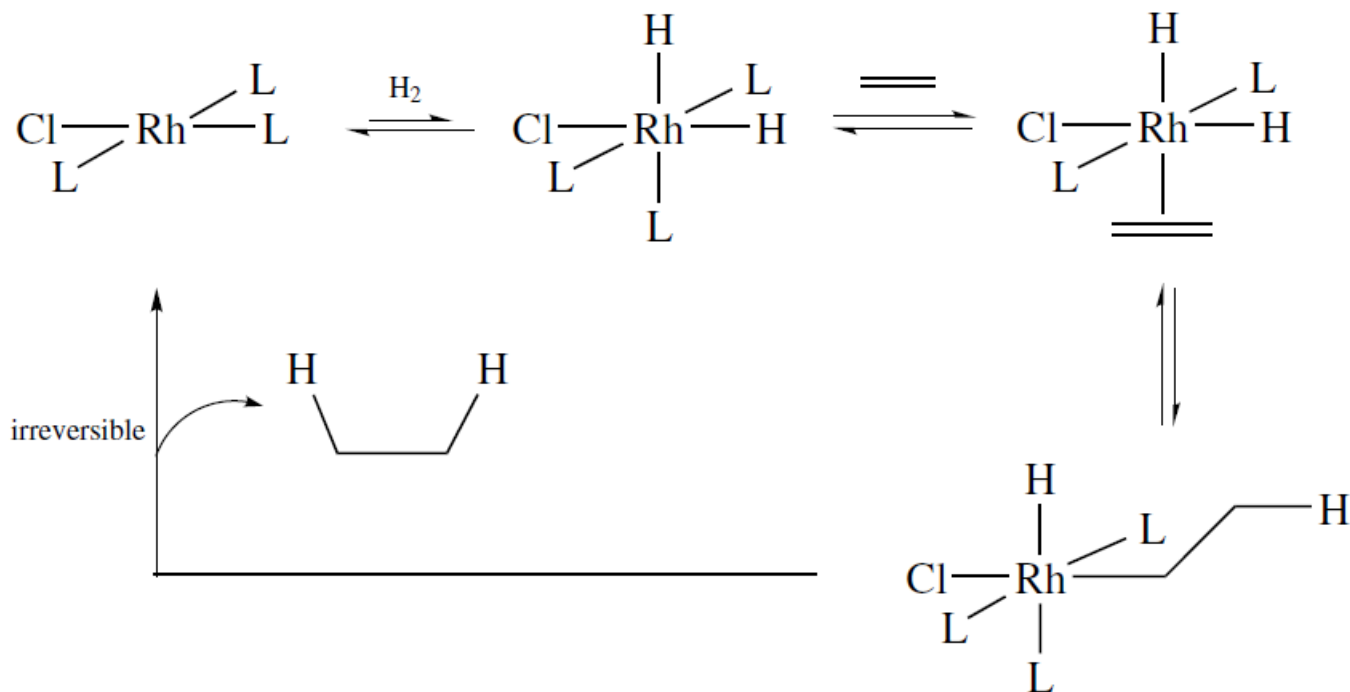
# Organometallic Catalysis Part-1

CH3208

By

Dr. Moumita Mondal

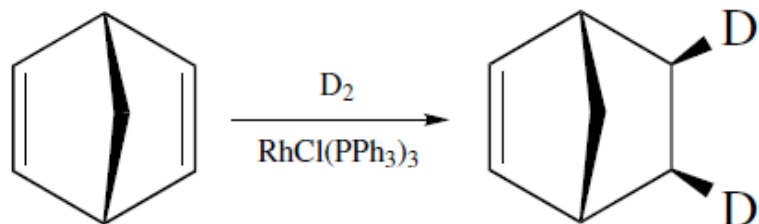
## Alkene Hydrogenation by Wilkinson's Catalyst



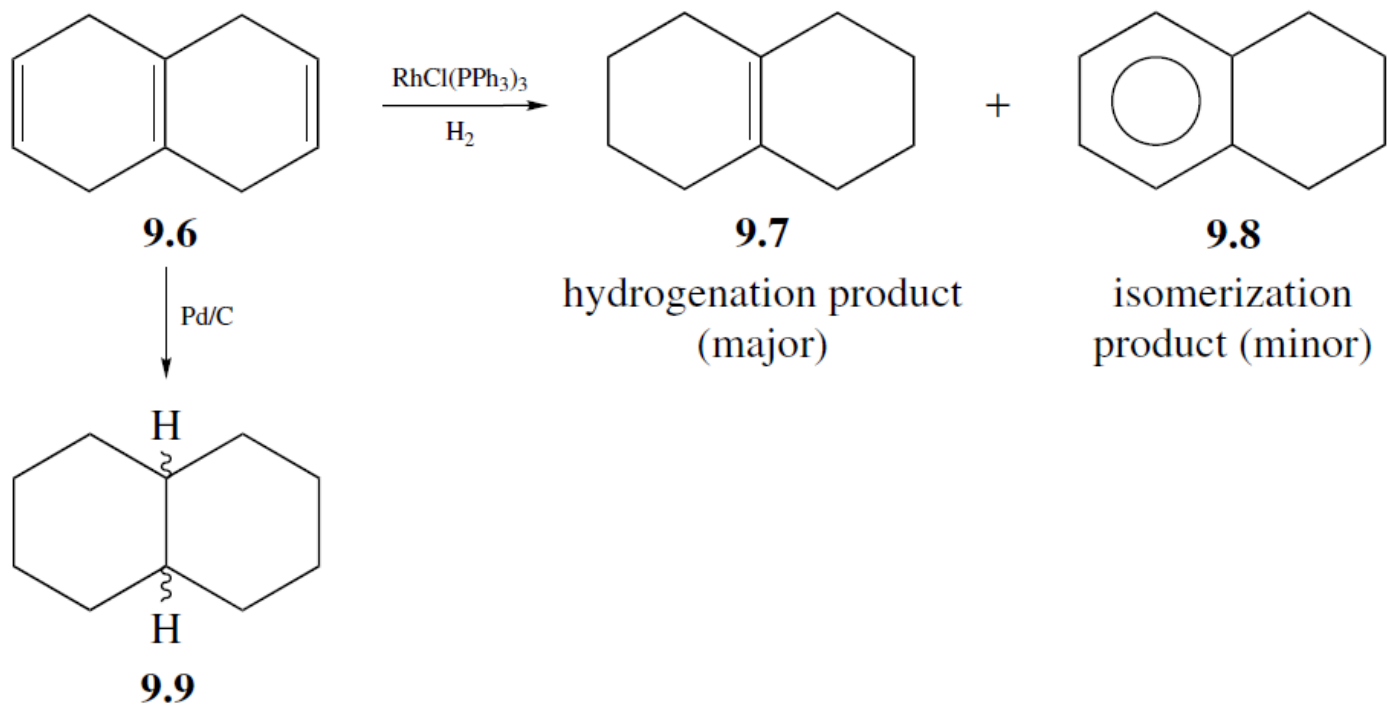
**FIGURE 9.3** Mechanism for the hydrogenation of alkenes by Wilkinson's catalyst. Other pathways also operate in this system, however.

*Ref: R. H. Crabtree, The Organometallic Chemistry of Transition Metals*

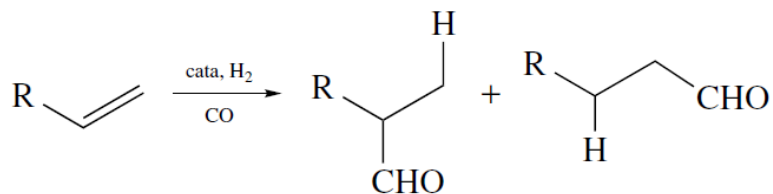
## Syn-addition of H<sub>2</sub> to alkene



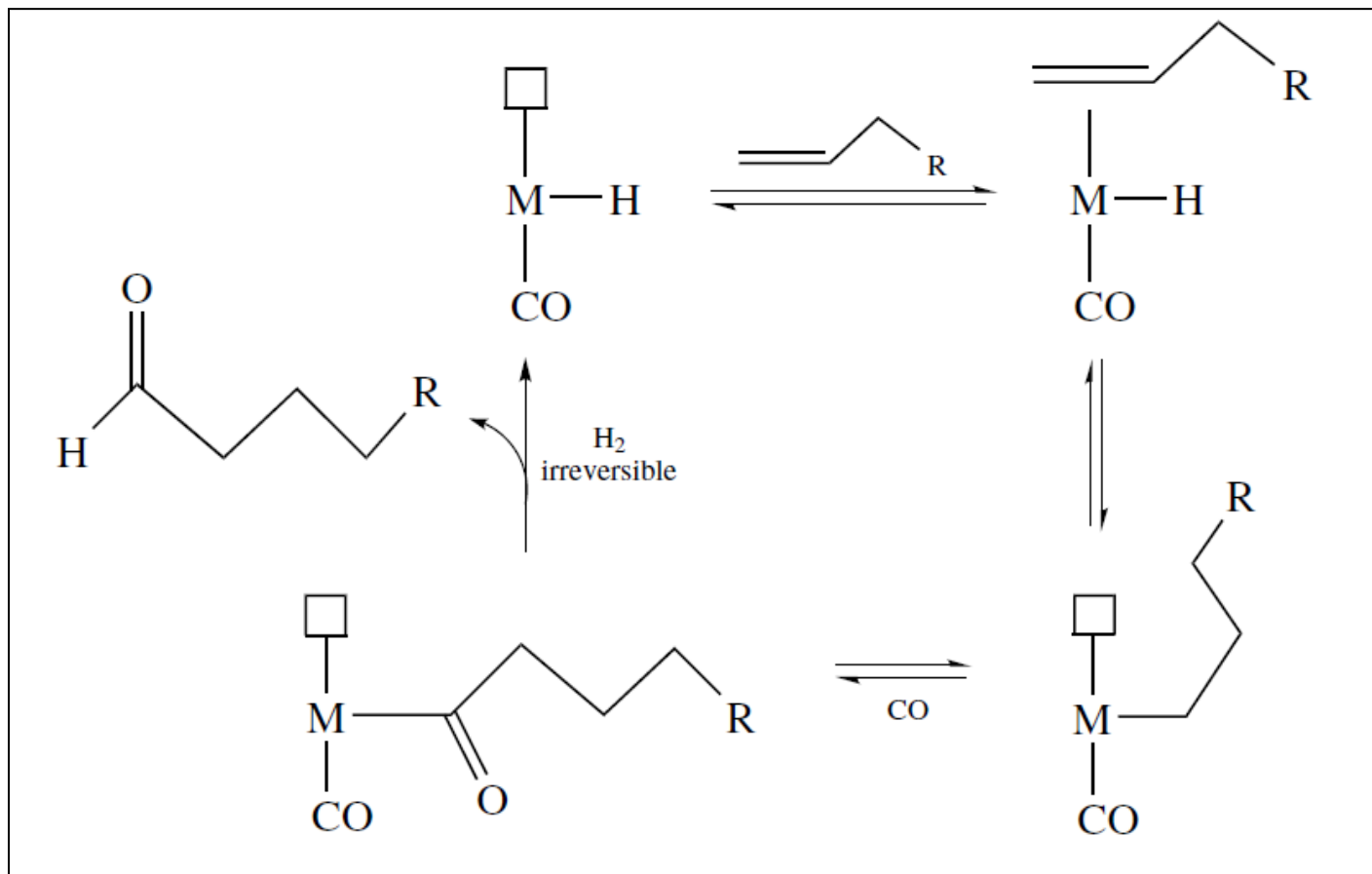
## Selective hydrogenation of less sterically hindered alkene



# Alkene Hydroformylation

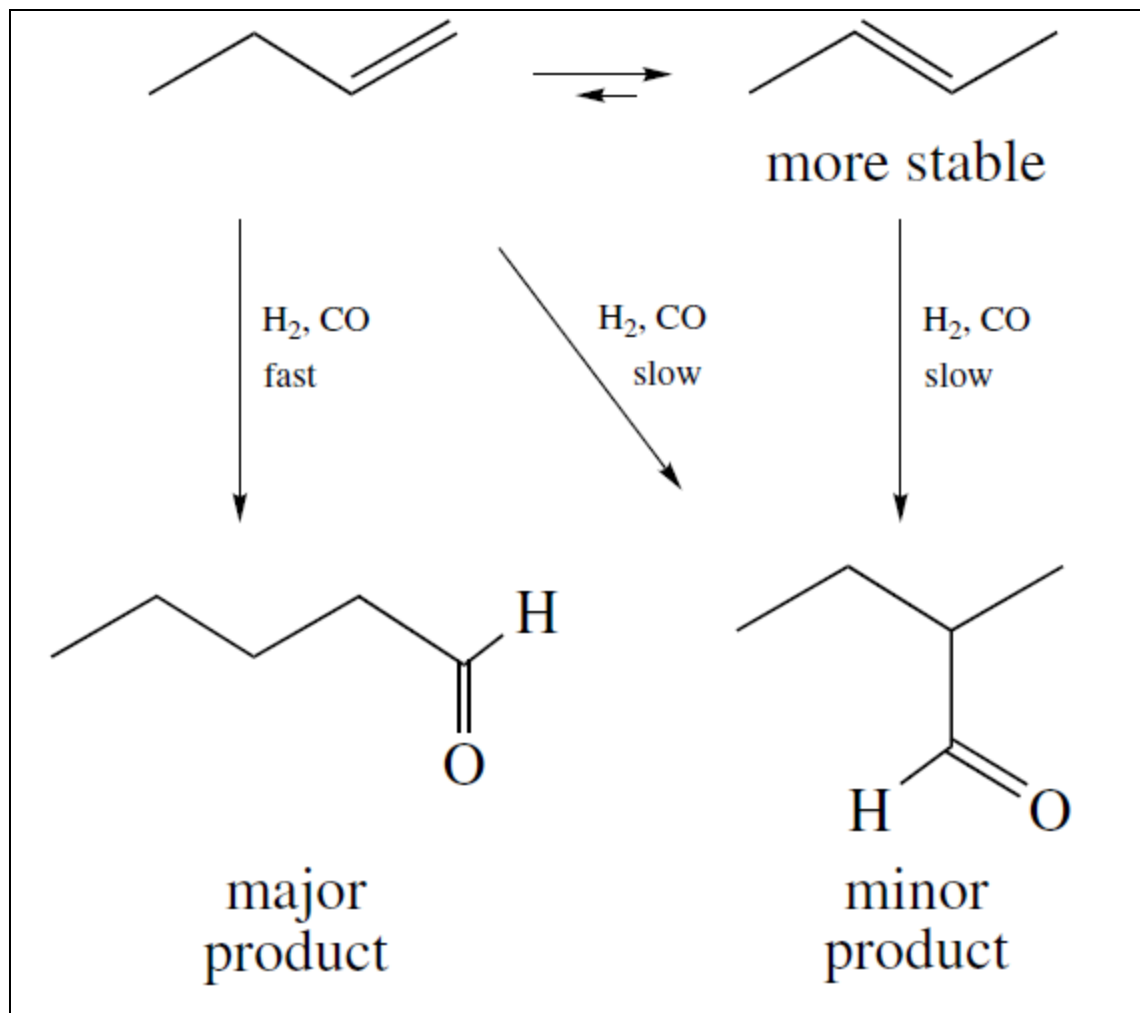


## Mechanism



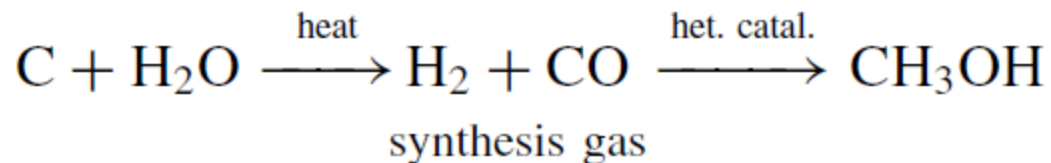
Ref: R. H. Crabtree, *The Organometallic Chemistry of Transition Metals*

## Product Selectivity

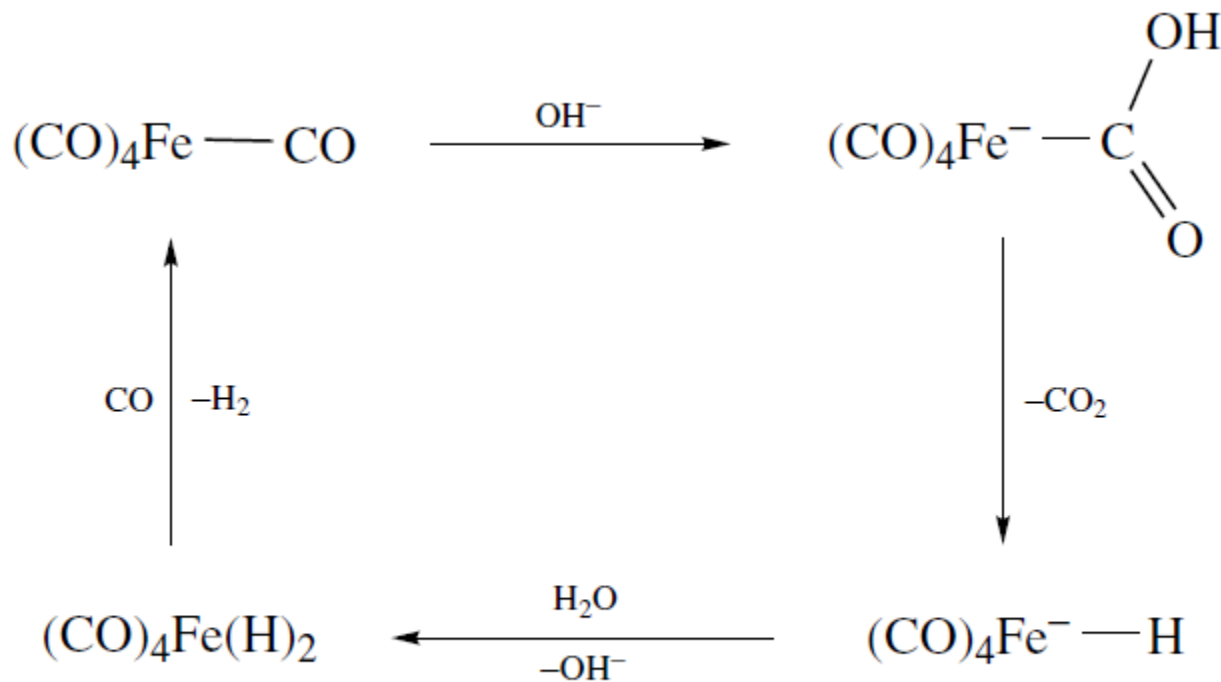
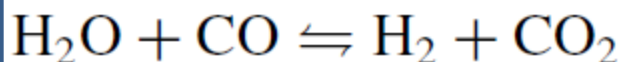


*Ref: R. H. Crabtree, The Organometallic Chemistry of Transition Metals*

# Conversion of water gas to syn gas

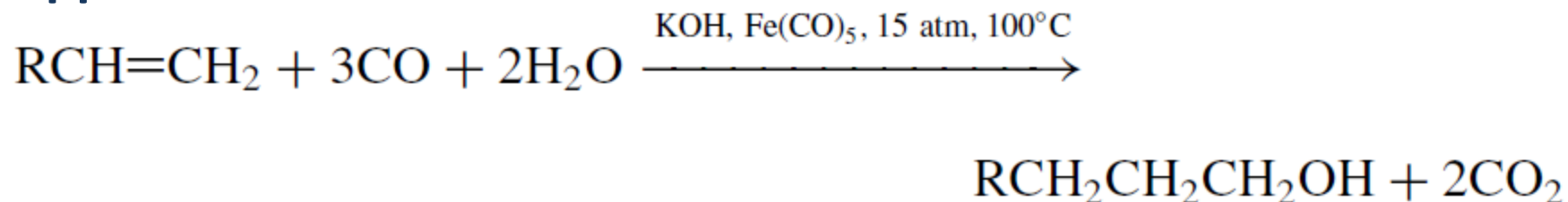


## Water gas shift

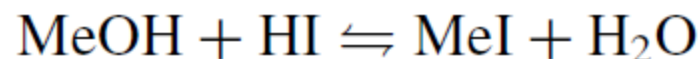
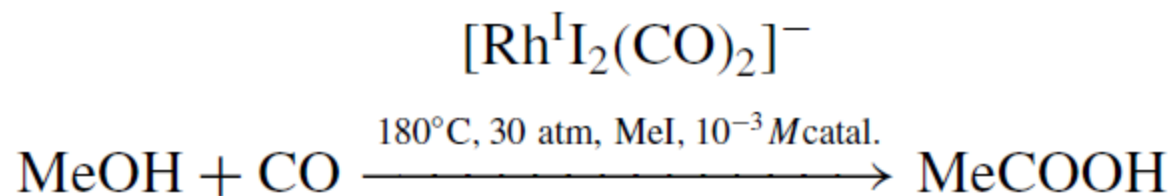


Cycle proposed for the  $\text{Fe}(\text{CO})_5$ -catalyzed water-gas shift reaction.

## Reppe Reaction



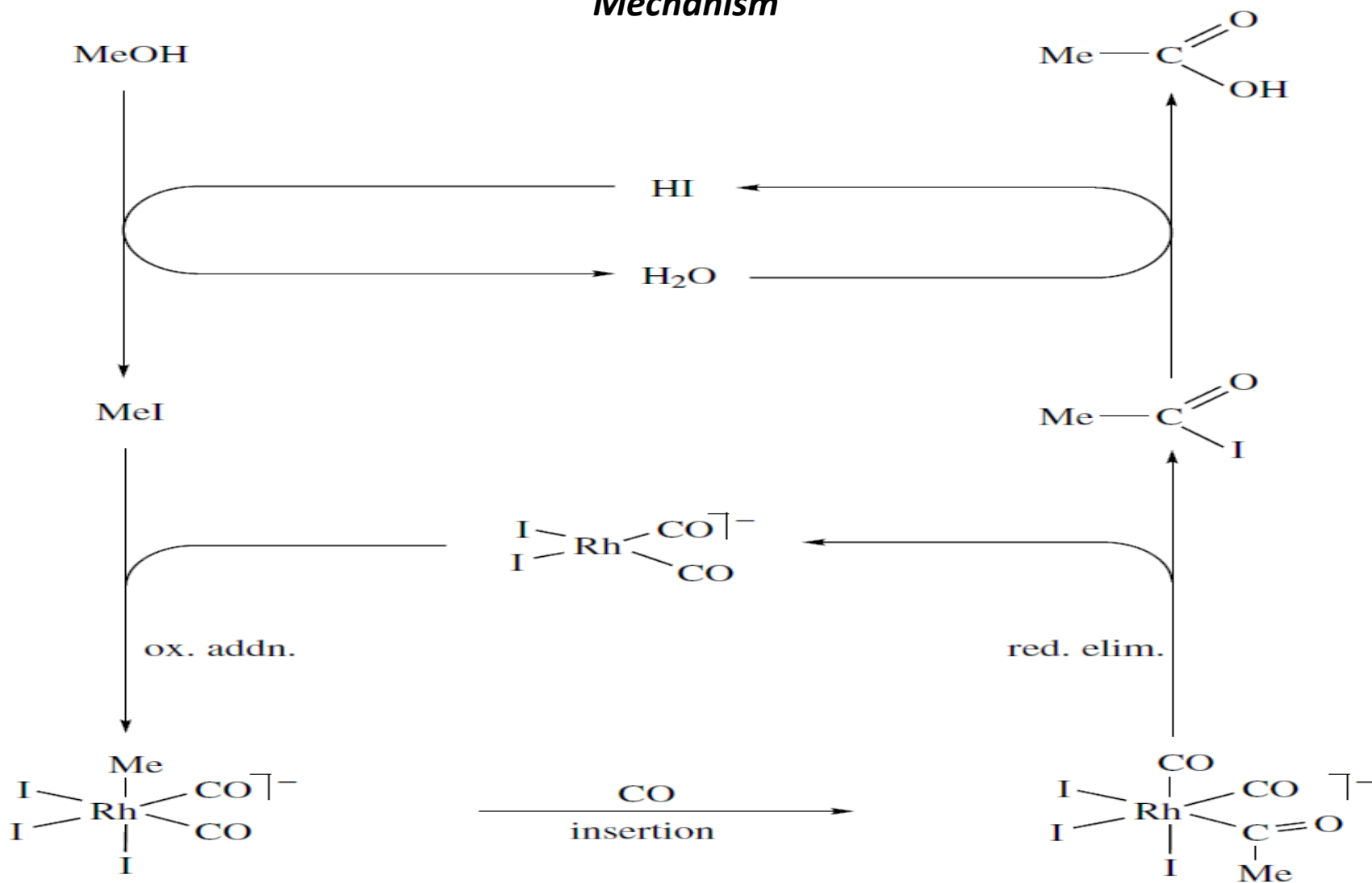
## Monsanto acetic acid process



***100% atom economy***

# Monsanto acetic acid process

## Mechanism



Ref: R. H. Crabtree, *The Organometallic Chemistry of Transition Metals*