

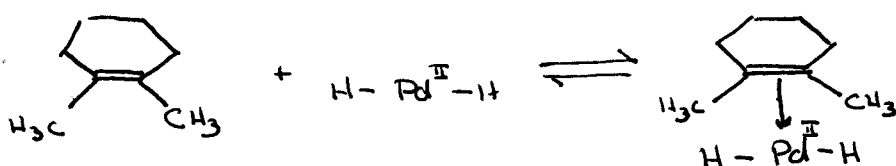
# CATALYTIC HYDROGENATION

THE MECHANISM OF CATALYTIC HYDROGENATION INVOLVES SEVERAL STEPS THAT YOU HAVE NOT YET SEEN. THE METAL SURFACE WILL BE REPRESENTED BY  $\text{Pd}^0$ , AS IF A SINGLE PALLADIUM MOLECULE IS PERFORMING THIS

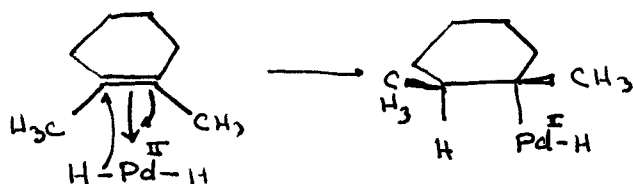
STEP 1 OXIDATIVE ADDITION OF  $\text{H}_2$  TO THE METAL



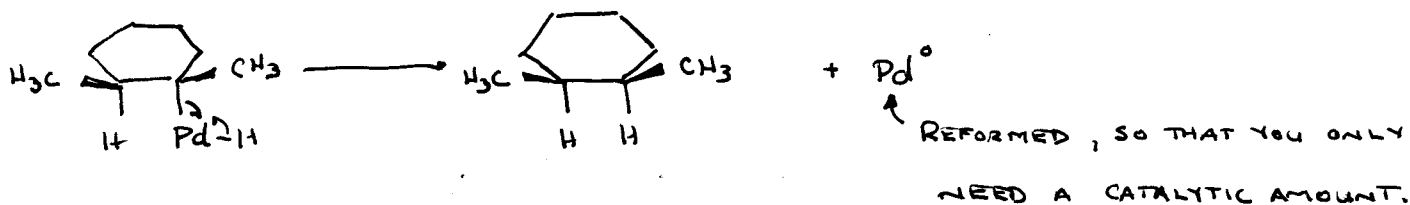
STEP 2 COORDINATION OF ALKENE TO  $\text{Pd}^{\text{II}}$



STEP 3 INSERTION OF THE ALKENE INTO THE  $\text{Pd}-\text{H}$  BOND  
- MUCH LIKE IN HYDROBORATION, THIS IS A CIS ADDITION



STEP 4 A REDUCTIVE ELIMINATION OF THE  $\text{C}-\text{Pd}$  AND  $\text{H}-\text{Pd}$ , TO GIVE A  $\text{C}-\text{H}$  BOND AND  $\text{Pd}^0$  BACK. THIS ALSO OCCURS WITH RETENTION OF CONFIGURATION,  $\therefore$  OVERALL CIS ADDITION OF  $\text{H}_2$



THIS IS TAUGHT MORE CLOSELY IN THE 350 COURSE