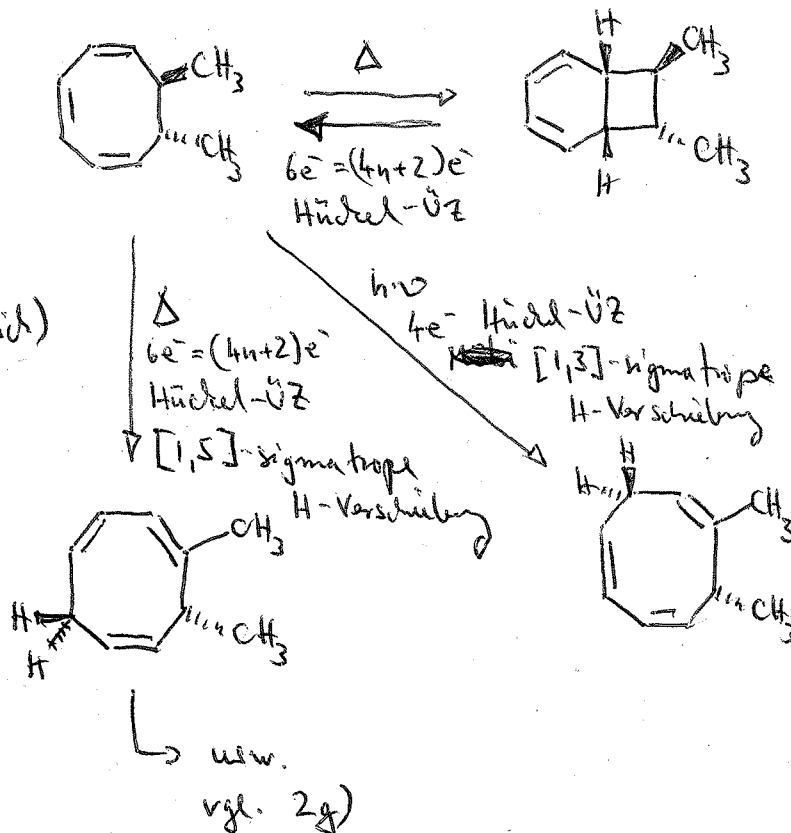
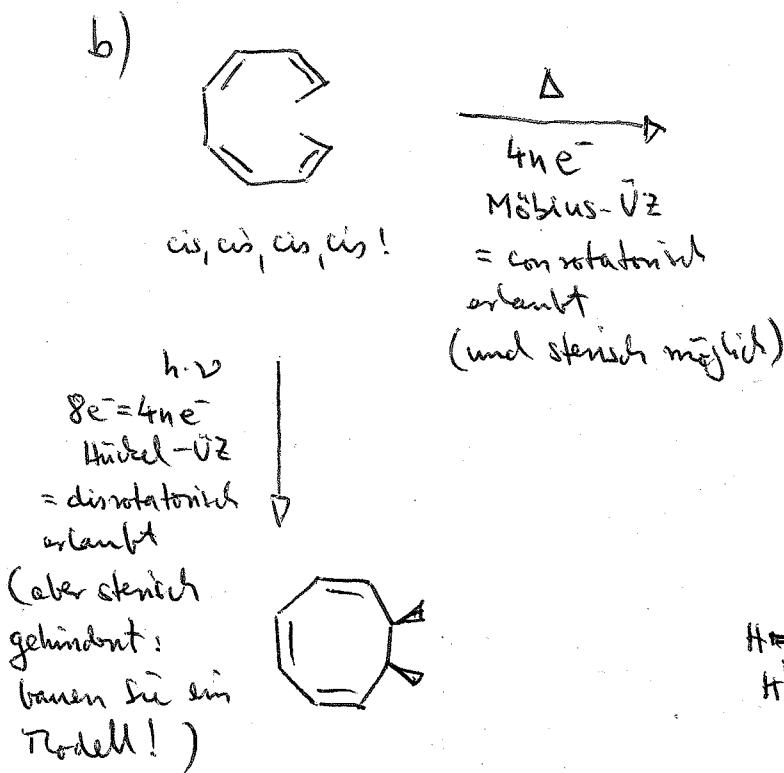
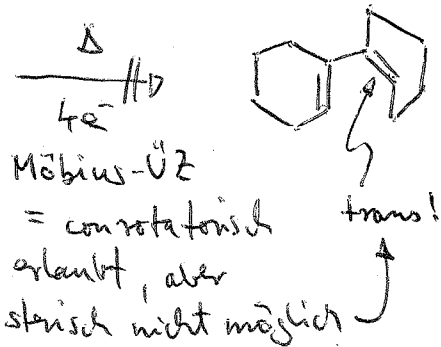
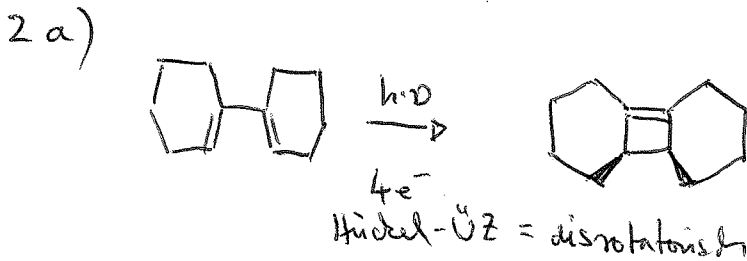
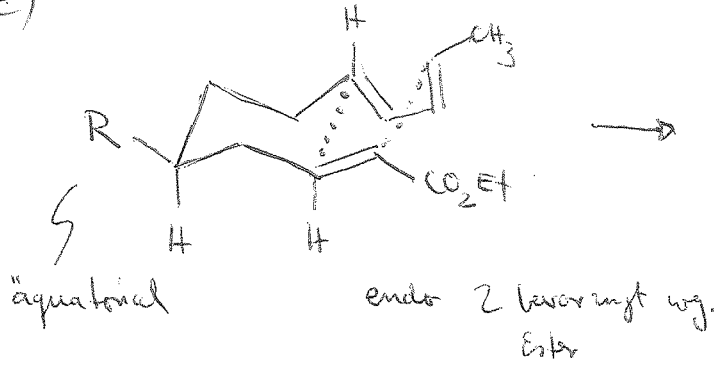


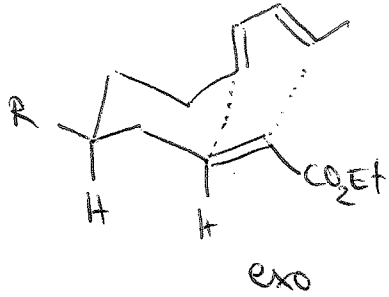
Die Koordination der Lewis-Säure senkt die Energie des LUMOs und verringert daher den HOMO-LUMO-Abstand. Folglich wird die Reaktion schneller.



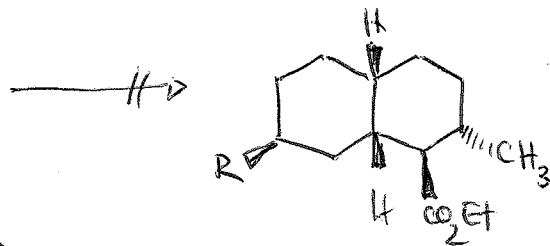
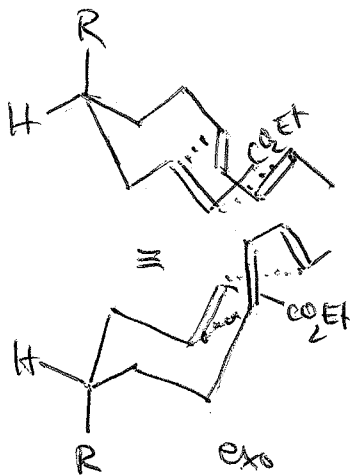
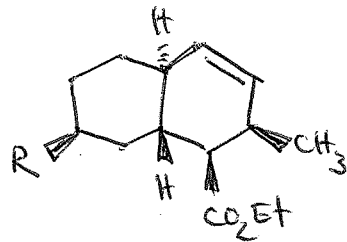
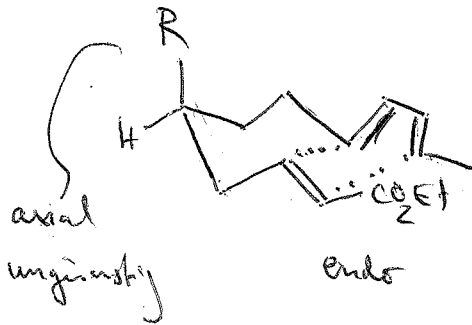
c)



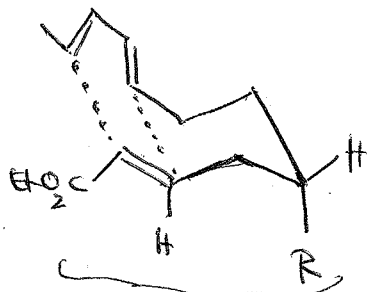
Hauptprodukt



evtl. Nebenprodukt

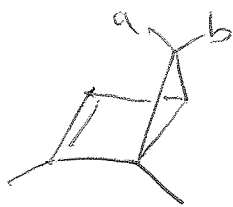


unübersichtliche Perspektive



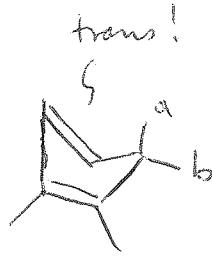
Ansicht gedreht, so dass sich keine Bindungen überschneiden.

d)



conrotatorische  
Ringöffnung?

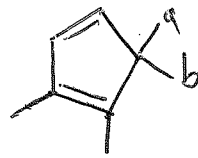
$\Delta$ ,  $4e^-$ , ~~Hückel~~ Möbius  
erlaubt, aber  
geometrisch  
wz. Cyclopropannung  
nicht möglich.



disrotatorische

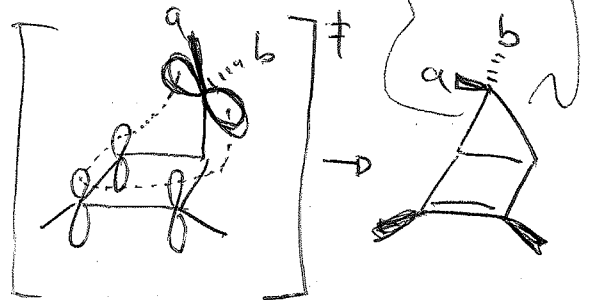
Ringöffnung?

$h.v.$ ,  $4e^-$ , Hückel  
erlaubt und möglich

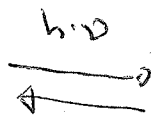
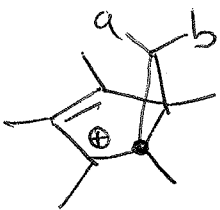


[1,3] sigmatope Verschiebung?

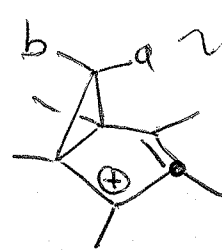
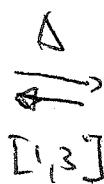
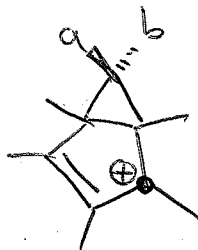
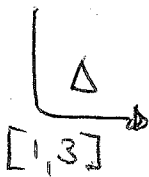
$\Delta$ ,  $4e^-$ , Möbius  
erlaubt? möglich? ja



genaus:

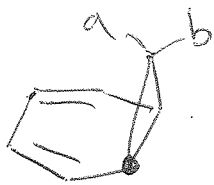


vgl. h)



bleibt über dem Ring (endo)

u.ä.

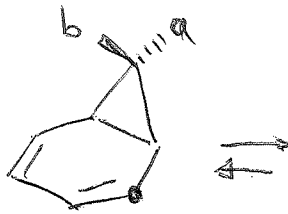


$\Delta$   
 $6e^- = 4n + 2$   
 Hückel erlaubt  
 = disrotatorische  
 Ringöffnung



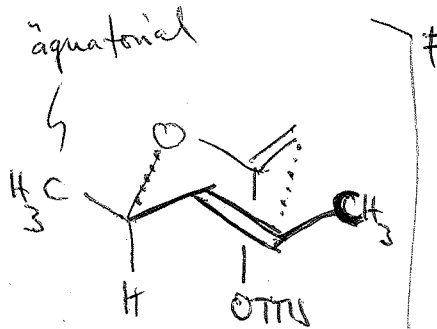
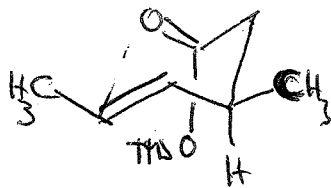
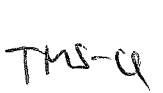
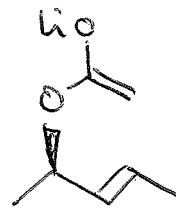
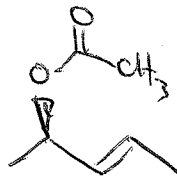
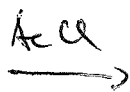
schnell, irreversibel

$\Delta$   
 [1,5]  
 auch erlaubt,  
 aber langsamer

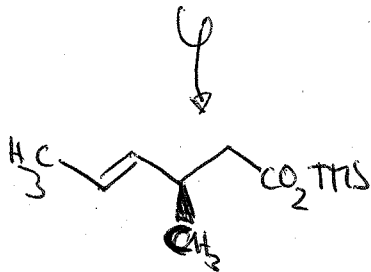


rechnet von  
 endo nach  
 exo mit  
 jeder [1,5]  
 sigmatropen  
 Verschiebung  
 (Wandlung  
 mit Retention  
 bei \*)

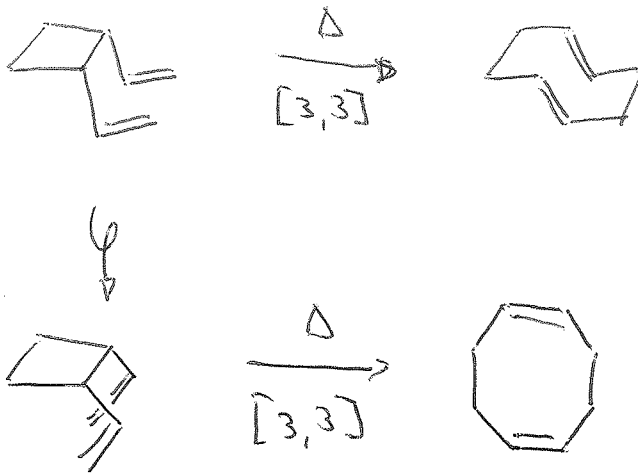
e)



[3,3]-sigmatrope  
 Umlagerung (Ireland-Claissen)

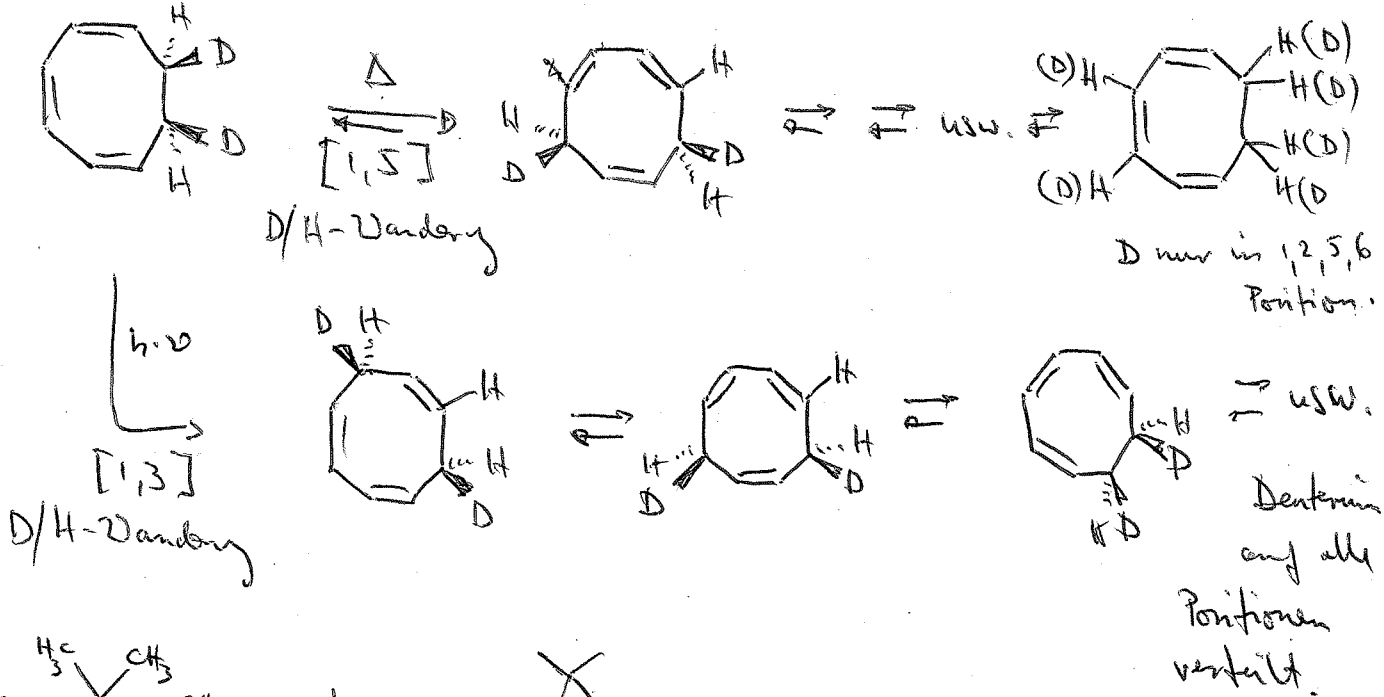


f)

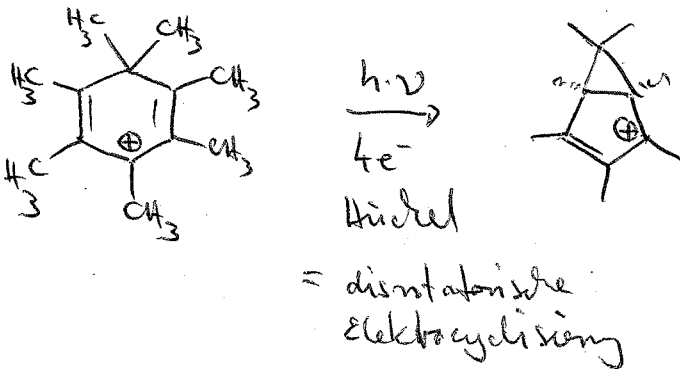


Beides sind  
Cope-Umlegungen,  
die über einen  
boot förmigen Übergangs-  
zustand verlaufen.  
Der senkel förmige  
ÜZ ist wegen des  
viergliedrigen Rings nicht  
zugänglich (Modell bauen!)

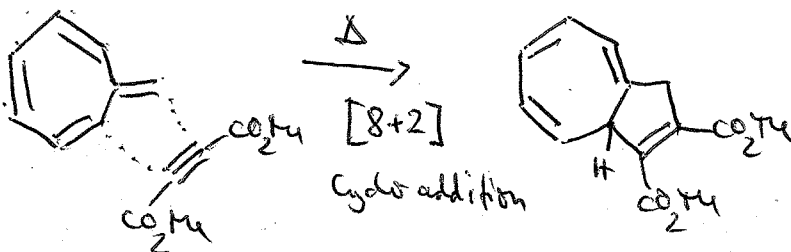
g)



h)



i)



$10e^- = 4n+2$   
Hückel  
 $\Delta$ , erlaubt  
sterisch kein Problem.

