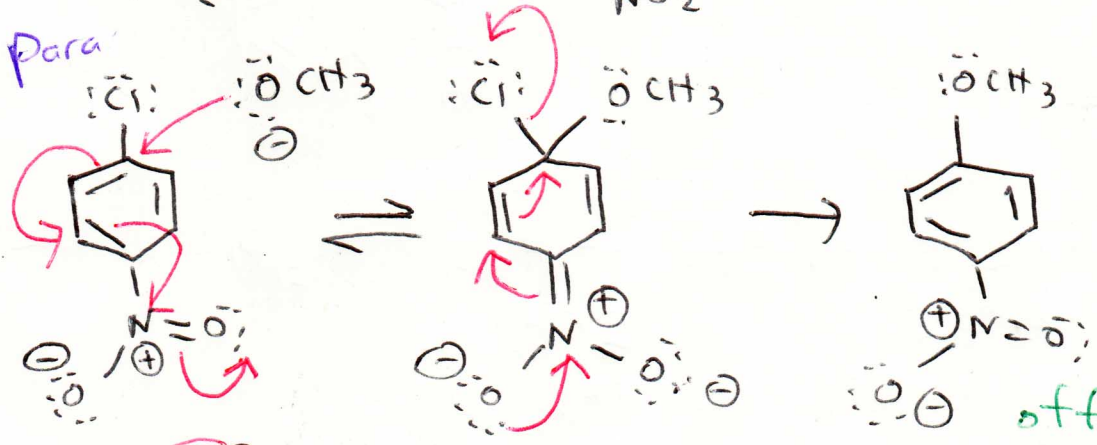
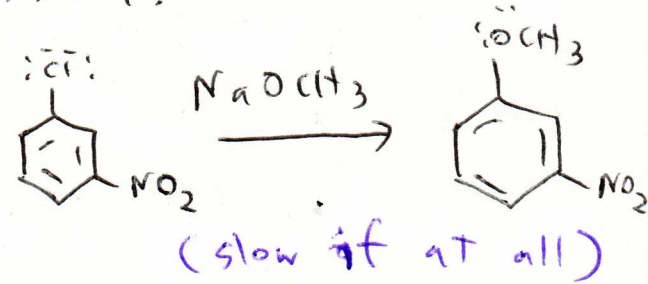
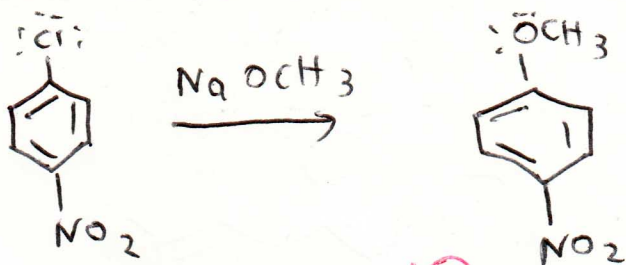
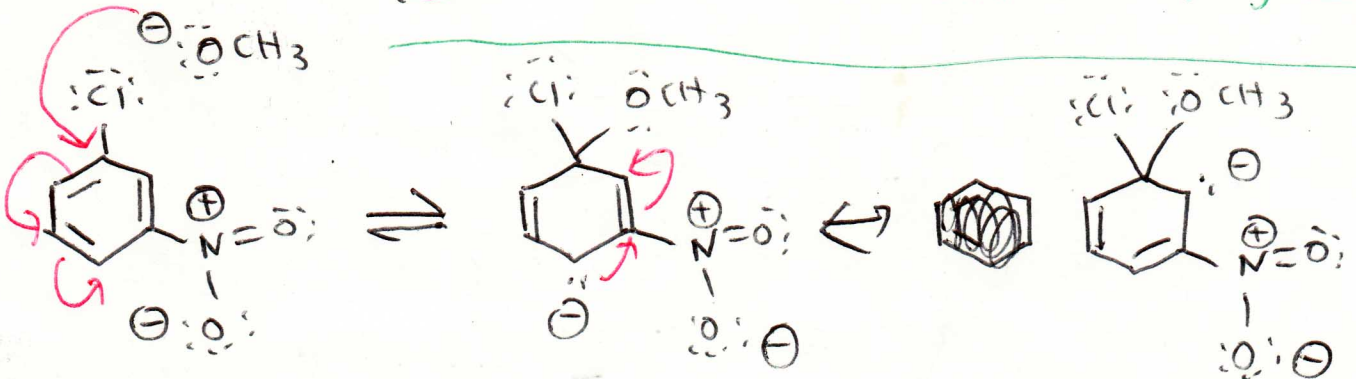


S_N2 is not possible due to steric hindrance (the nucleophile would have to pass through the ring) and due to repulsion from the π system.

S_N1 is not possible because the resulting change in hybridization ($sp^2 \rightarrow sp$) would be unfavorable geometrically and would form a carbocation at a ~~too~~ vinyl position, which is unfavorable due to the large s-character of the orbital.



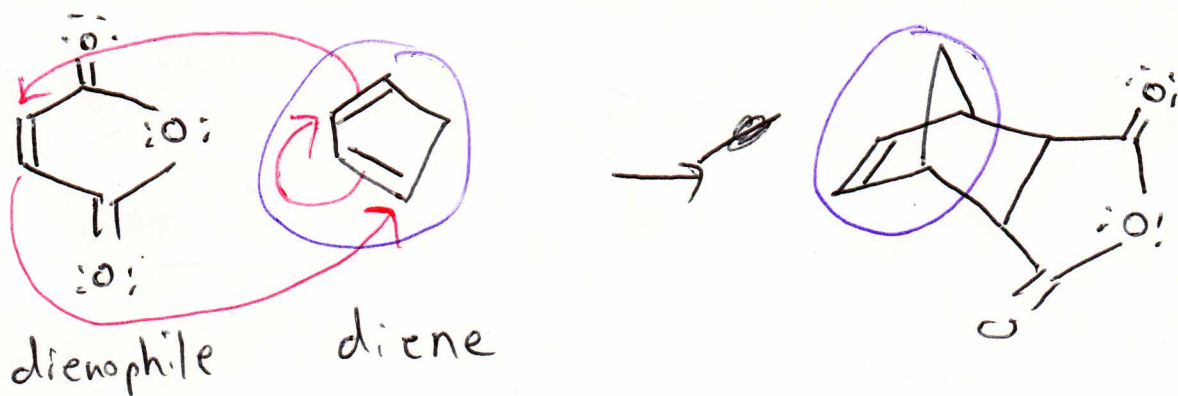
Nucleophilic Aromatic Substitution
 \ominus is delocalized off the ring \rightarrow ||



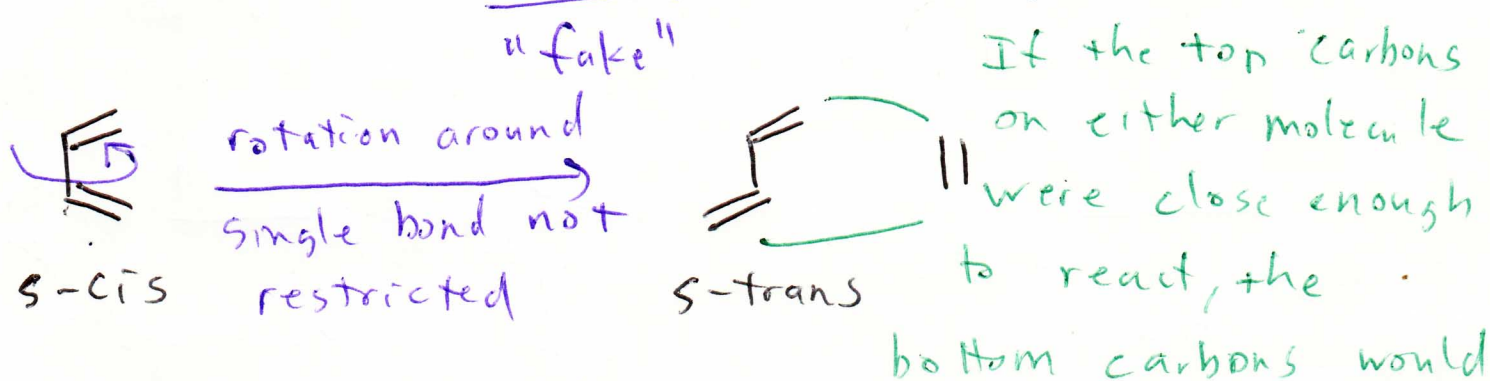
No delocalization of \ominus off ring \rightarrow ||

What helps an electrophilic addition hurts a nucleophilic addition.

Diels-Alder rxn : [4+2] cycloaddition

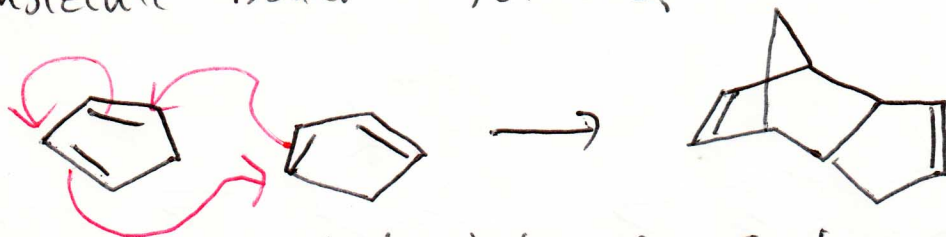


Diels-Alder rxns can only occur if the π bonds are in a pseudo-cis configuration.



If a diene is "locked" into a s-cis configuration, it would be a lot more reactive than a comparable diene!

Cyclopentadiene is reactive enough that it naturally occurs as a dimer (two of the same atom/molecule bound together).



If a diene is locked into a s-trans configuration, it will be unreactive.



* In Diels-Alder rxns, the diene must be conjugated.

