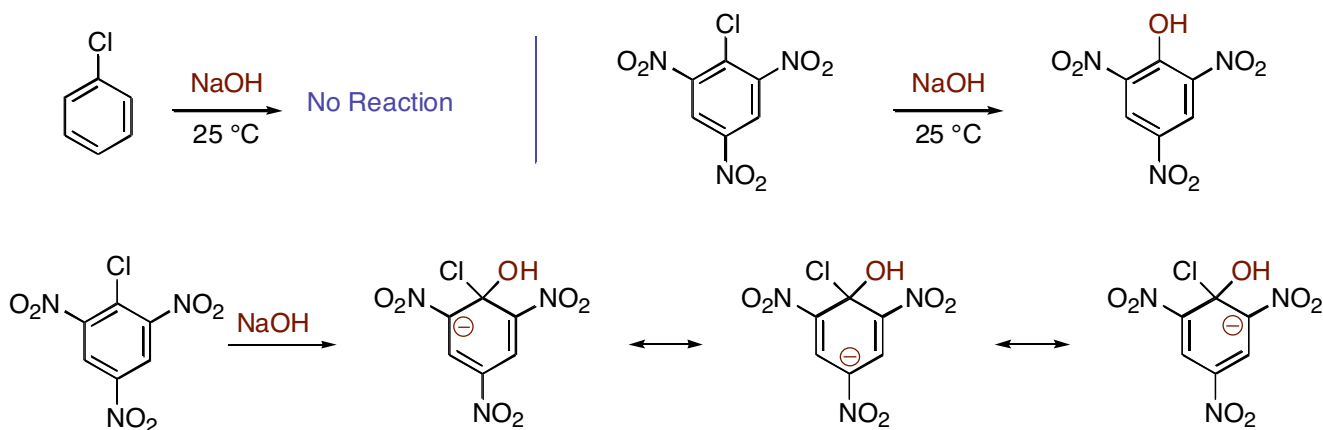


These notes can be obtained at: <http://www.ndsu.nodak.edu/instruct/grcook/chem342/notes.shtml>

Chapter 16: Chemistry of Benzene: Electrophilic Aromatic Substitution

Nucleophilic Aromatic Substitution

Under normal conditions, nucleophiles don't react with aromatic rings. However, if there are good electron withdrawing groups on the ring, nucleophilic substitution can take place. This does not occur by an S_N1 or S_N2 reaction. The mechanism is an addition of the nucleophile followed by loss of the leaving group. The electron withdrawing groups need to be ortho or para to the leaving group. This is where the negative charge appears in the intermediate. Thus, the more you can stabilize the negative charge, the better the reaction will be. Note, that m-nitrochlorobenzene will not undergo nucleophilic substitution, while o- or p-nitrochlorobenzene will.



Under extreme conditions, nucleophilic substitution can occur on aromatic rings without electron withdrawing groups. The mechanism involves an elimination to form a reactive intermediate (benzyne) to which the nucleophile adds.

