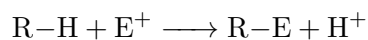

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Electrophilic substitution reaction

General expression for electrophilic reaction



Reactants in general reaction of electrophilic reaction

- Hydrogen containing alkyl group
- Electrophile

Products in general reaction of electrophilic reaction

- Alkyl electrophile compound
- Hydrogen ions

Type of group exhibited by nitro unit nitrobenzene

Meta directing

Conjugated systems in organic compounds

Alternate single and double bond

- Conjugated systems are found at aromatic compounds

Term for alternate single and double bonds in organic compounds

Conjugated system

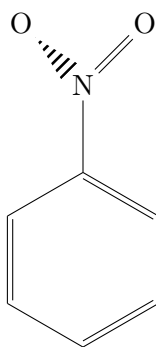
Lewis structure exhibited by nitrogen of nitro unit in nitrobenzene

Electrophile

Cause of exhibition of electrophile by nitrogen of nitro unit in nitrobenzene

Absence of Lone pair of electron in nitrogen

Structure of resonance of hybrid of nitrobenzene



[Pictorial illustration is missing. Time complications.]

- Nitro unit in nitrobenzene has two oxygens and one nitrogen.
- One oxygen is bonded covalently.
- The remaining valency of nitrogen is fulfilled by electron from benzene ring.
- The two lone pairs of nitrogen are used by the remaining oxygen atom to gain stability.
- The bond between remaining oxygen atom and nitrogen is dative bond.
- The nitrogen acts as electron withdrawing group.
- Nitrogen withdraws electron from the ortho position of benzene ring
- Nitrogen forms a double bond with the ring.
- Carbon at ortho position bears a positive charge
- Nitrogen has 4 bonds which is not possible.
- Covalently bonded oxygen takes one of the electron
- Oxygen bears a negative charge.
- The lower double bond at the ring shifts to compensate the bond at positively charged ortho position.
- The para position has a positive charge.
- The double bond shifts to compensate the positive charge of para position.

-
- The ortho position bears a positive charge.
 - The bond from nitrogen compensates the positive ortho position.
 - Nitrogen has 2 bonds.
 - Oxygen and nitrogen establish double covalent bond.

Final structure of resonance hybrid of nitrobenzene

[Pictorial illustration is missing. Time complications.]

- Partial negative charge at oxygen atom.
- Partial positive charge at ortho and para positions.
- Delocalized bonds inside benzene ring.
- Delocalized bond between covalently bonded nitrogen and oxygen.
- Delocalized bond between nitrogen and benzene ring.

Type of charge developed at one oxygen atom of nitrobenzene

Partial negative



Location of partial positive charge at nitrobenzene

- Ortho
- Para

Type of charge developed at ortho and para position of nitrobenzene

Partial positive



Cause of nitro group to exhibit meta directing group in nitrobenzene

High electron density at meta position