



Organic Chemistry Revision Sheets

Benzene | Electrophilic Substitution, Friedel-Crafts (Acylation)

Reaction

REACTANTS: Benzene and Acyl Chloride

CONDITIONS: Warm and AlCl_3 catalyst

PRODUCT: (Aromatic) Ketone

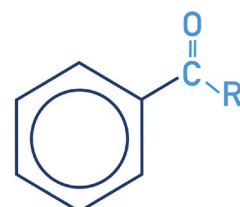
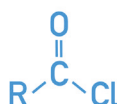
REACTION TYPE: Electrophilic Substitution, *Acylation*

REACTION:
(example of
benzene)



Benzene

+

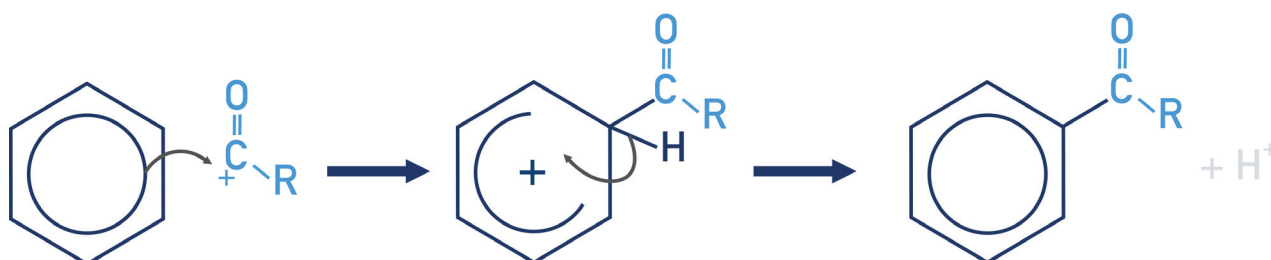


(Aromatic) Ketone

+ HCl

Mechanism

Acylium (RCO^+) ion **acts as an electrophile due to its carbocation accepting an electron pair** from the delocalised ring of electrons in the benzene ring. A carbon-carbon bond forms. The carbon-hydrogen bond breaks to give the electron pair back to the ring of delocalised electrons. RCO^+ ion replaces H on benzene ring. **Substitution reaction.**



Notes:

- Acylium (RCO^+) ion is formed by reacting an acyl chloride with a halogen carrier (AlCl_3)



- H^+ ion removed from benzene ring combines with $[\text{AlCl}_4]^-$ to reform AlCl_3 catalyst and HCl is formed:

