

Halogenation (substitution)

Reagent Cl₂ / Br₂

Catalyst AlCl₃ / FeCl₃

catalyst produce electrophile

Equation C₆H₆ + Cl₂ → C₆H₅Cl + HCl

Mechanism free radical substitution

Formation of halonium ion

Halogenation (addition)

Reagent Cl₂ / Br₂

Condition UV light

Equation C₆H₆ + 3Cl₂ → C₆H₆Cl₆

Mechanism free radical addition reaction

Friedel-Craft Acylation

Reagent RCOCl (acyl chloride)

Condition heat / 80°C

Catalyst AlCl₃ / FeCl₃

catalyst produce electrophile

Mechanism electrophilic substitution

Equation C₆H₆ + RCOCl → RCOC₆H₅ + HCl

Halogenation of alkylbenzene (UV light)

Reagent Cl₂ / Br₂

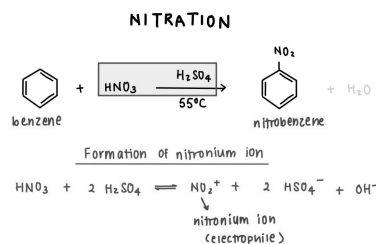
Condition UV light

Mechanism free radical substitution

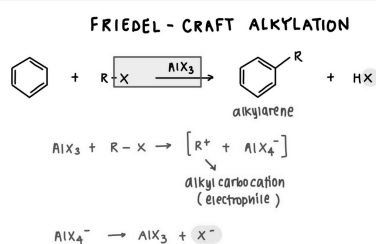
Equation (CH₃)C₆H₅ + X₂ → (CH₂X)C₆H₅ + HX

reaction occur in alkyl part

Nitration

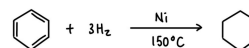


Friedel-Craft Alkylation



Hydrogenation

HYDROGENATION (addition)



Nitration

Reagent HNO₃

Condition 55°C

Catalyst concentrated H₂SO₄

catalyst produce electrophile

Mechanism electrophilic substitution

Equation C₆H₆ + HNO₃ → C₆H₅NO₂

Observation yellowish oil with almond smell

Formation of nitronium ion

Friedel-Craft Alkylation

Reagent RX

Condition room temperature

Catalyst AlX_3 / FeX_3

catalyst produce electrophile

Mechanism electrophilic substitution

Equation $C_6H_6 + RX \rightarrow C_6H_5R + HX$

X : halogen (Cl_2 / Br_2)

Hydrogenation

Reagent H_2 gas

Condition Pt, room temperature

Ni, $150^\circ C$

Equation $C_6H_6 + 3H_2 \rightarrow C_6H_{12}$

Halogenation of alkylbenzene (catalyst)

Reagent Cl_2 / Br_2

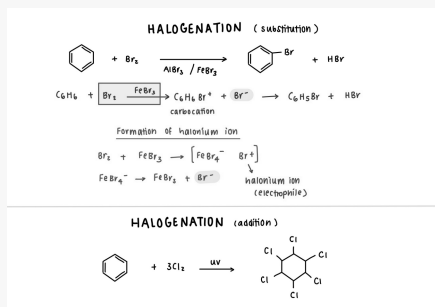
Catalyst AlX_3 / FeX_3

Mechanism electrophilic substitution

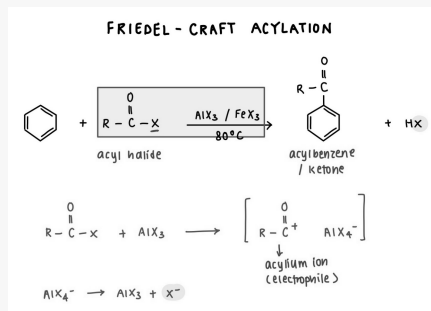
Equation $(CH_3)C_6H_5 + X_2 \rightarrow (CH_3)C_6H_4X + HX$

reaction occur in benzene ring

Halogenation



Friedel-Craft Acylation



Halogenation of alkylbenzene

