

REACTION OF BENZENE

- **NITRATION**
- **SULPHONATION**
- **HALOGENATION**
- **FRIDEL CRAFT ALKYLATION & ACYLATION**

NITRATION

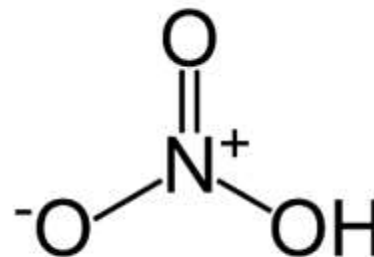
- The introduction of NO_2 (nitro group) on benzene
- Substitution of 1 hydrogen atom by NO_2 is known as nitration of benzene
- Nitrobenzene is formed with chemical formula- $\text{C}_6\text{H}_5\text{NO}_2$

NITRATION

- This reaction takes place in the presence of following reagents-
 1. Nitric acid - HNO_3
 2. Concentrated Sulphuric acid - H_2SO_4
(king of acid)

NITRATION MECHANISM

- OH^- is released by HNO_3 so only NO_2^+ (nitronium ion) remains which gets attached to benzene to form nitrobenzene



- H^+ is donated by conc. H_2SO_4 so HSO_4^- remains.
- H^+ & OH^- combines to give water

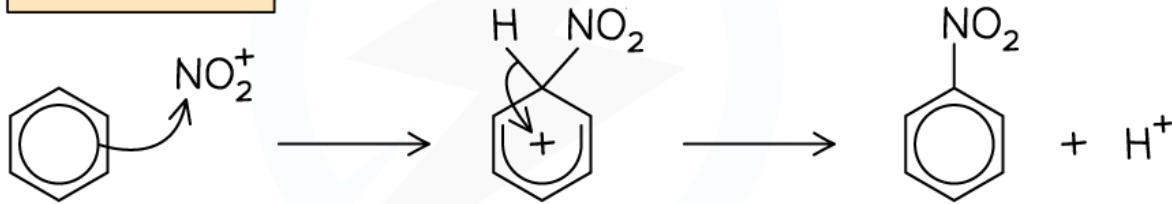
DEPTH OF BIOLOGY

FORMATION OF ELECTROPHILE

ELECTROPHILE

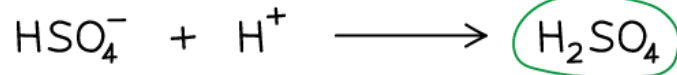


MECHANISM

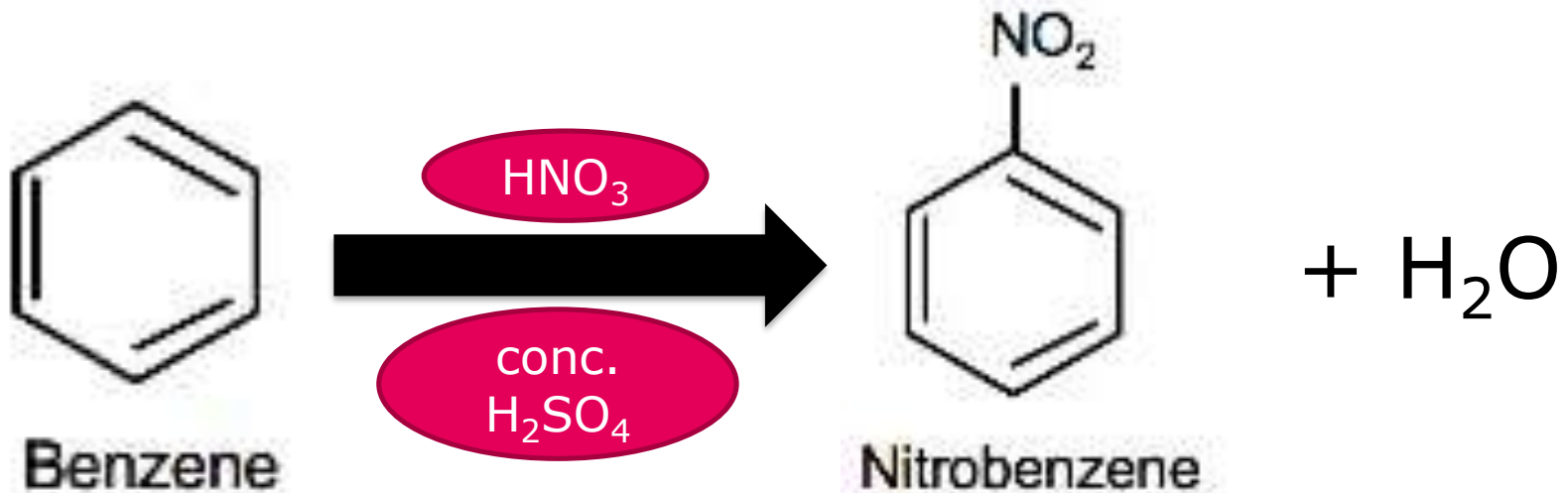


REFORMING THE CATALYST

CATALYST



NITRATION



APPLICATION OF NITRATION

- Majorly, nitration process chemistry in industry is utilised for making explosives. For instance, a Nitration reaction is used to form nitroguanidine from guanidine. The changing reaction of toluene structure (C_7H_8) to (TNT) / trinitrotoluene.
- Another significant use of nitration chemistry in the industry is the nitrated product called Dinitrotoluene. DNT/ Dinitrotoluene is transformed into toluene diisocyanates (toluene structure). The latter has its application in the production of elastomers, fibres, polyurethane foams and varnishes.
- Furthermore, they have wide applications as precursors for a reaction and as chemical intermediates in the reaction process and precursors.