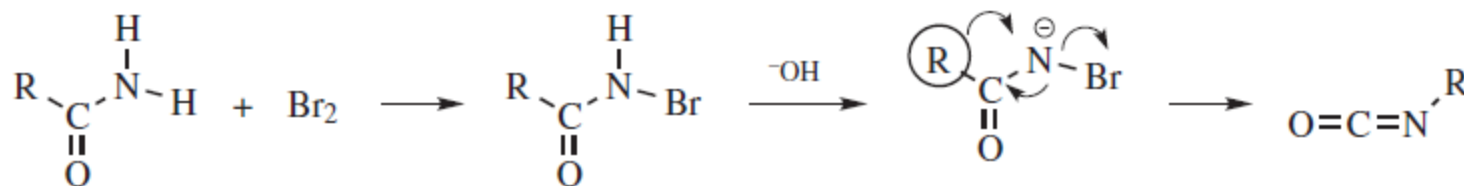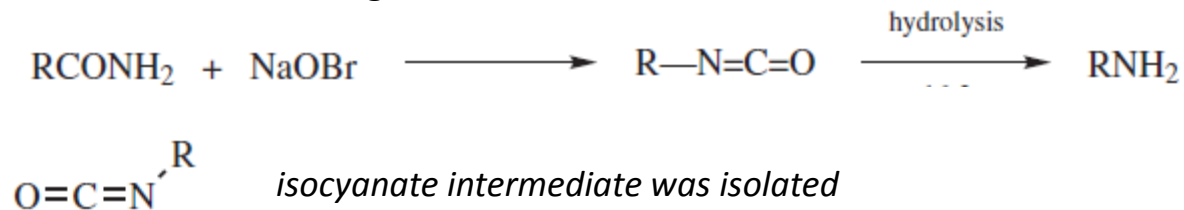# 3. Study of Intermediates

(i) Isolation of Intermediates

Example-1: Hoffmann Rearrangement

$$RCONH_2 + NaOBr \longrightarrow R{-}N{=}C{=}O \xrightarrow{\text{hydrolysis}} RNH_2$$

$O{=}C{=}N{-}R$ *isocyanate intermediate was isolated*
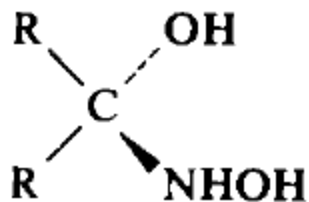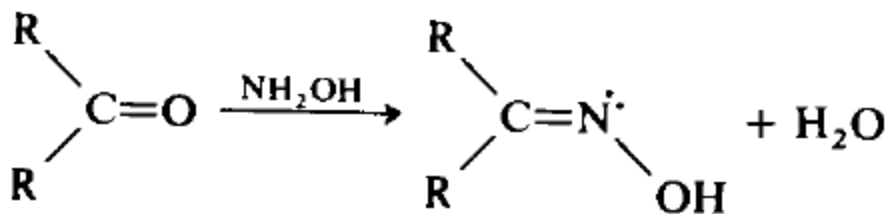

Example-2: Nebber Rearrangement
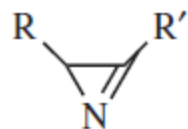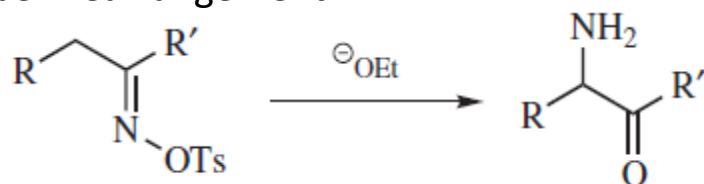
an azirene intermediate was isolated
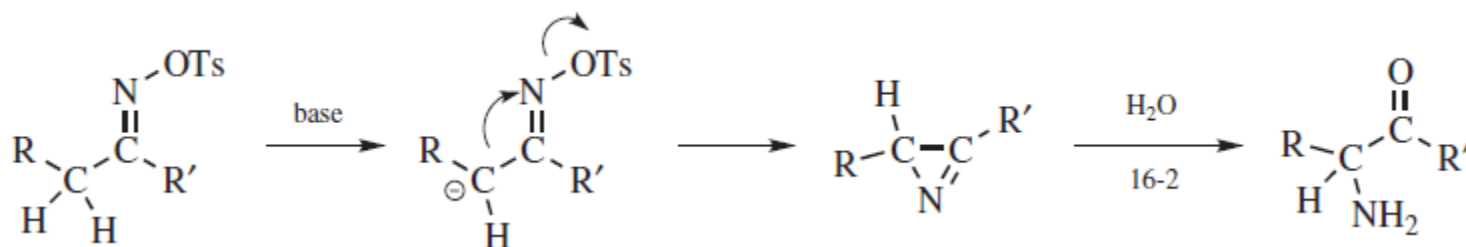
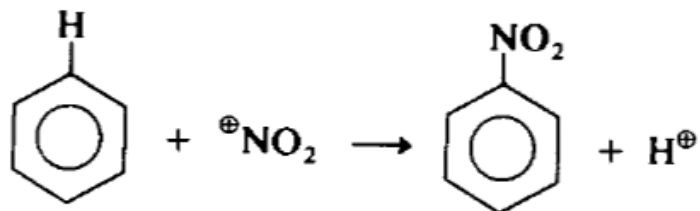## (ii) Detection of Intermediates

Example-1

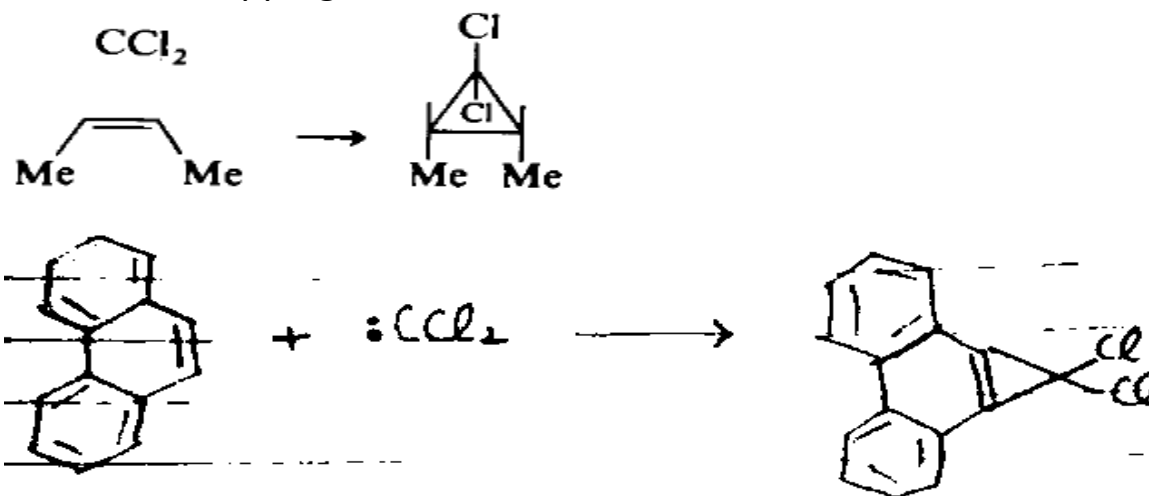*Carbinolamine intermediate was detected by IR spectroscopy*

Example-2

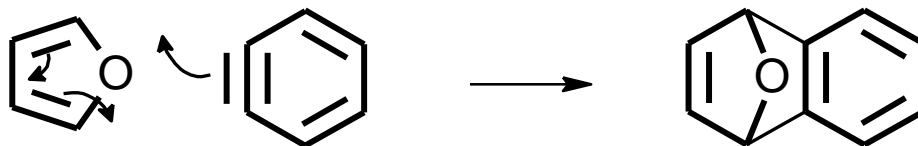$^{\oplus}NO_2$ *Nitronium ion intermediate was detected by Raman Spectroscopy spectroscopy*

Example-3: Free radicals are detected by ESR spectroscopy
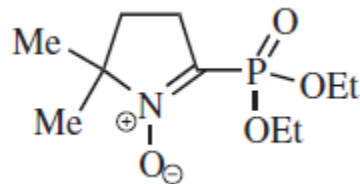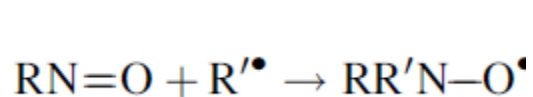
Example-1: Carbene Trapping

Example-2: Aryne Trapping

Example-3: Spin Trapping

$$RN{=}O + R'^{\bullet} \rightarrow RR'N{-}O^{\bullet}$$

2-(Diethylphosphino)-5,5-dimethyl-1-pyrroline-N-oxide
(Spin Trap)

(iv) Addition of Suspected of Intermediates