

JIWAJI UNIVERSITY GWALIOR (M.P.)

(SOS INDUSTRIAL CHEMISTRY)



TOPIC- HALOGENATION

LECTURE BY –
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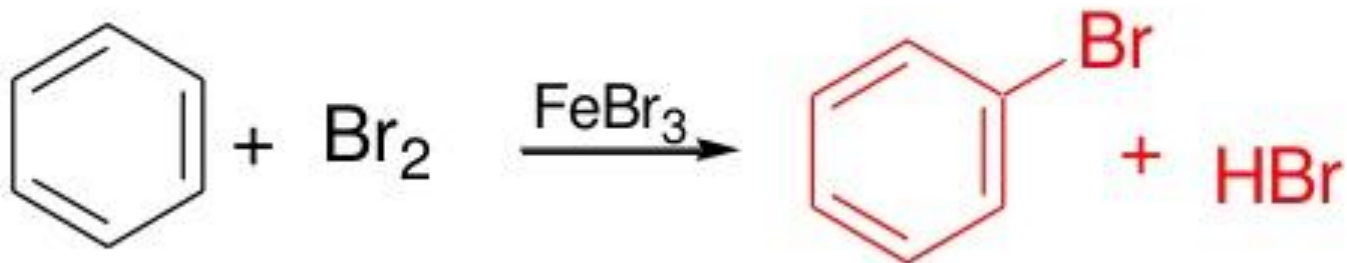
INDEX-

- HALOGENATION INTRODUCTUION
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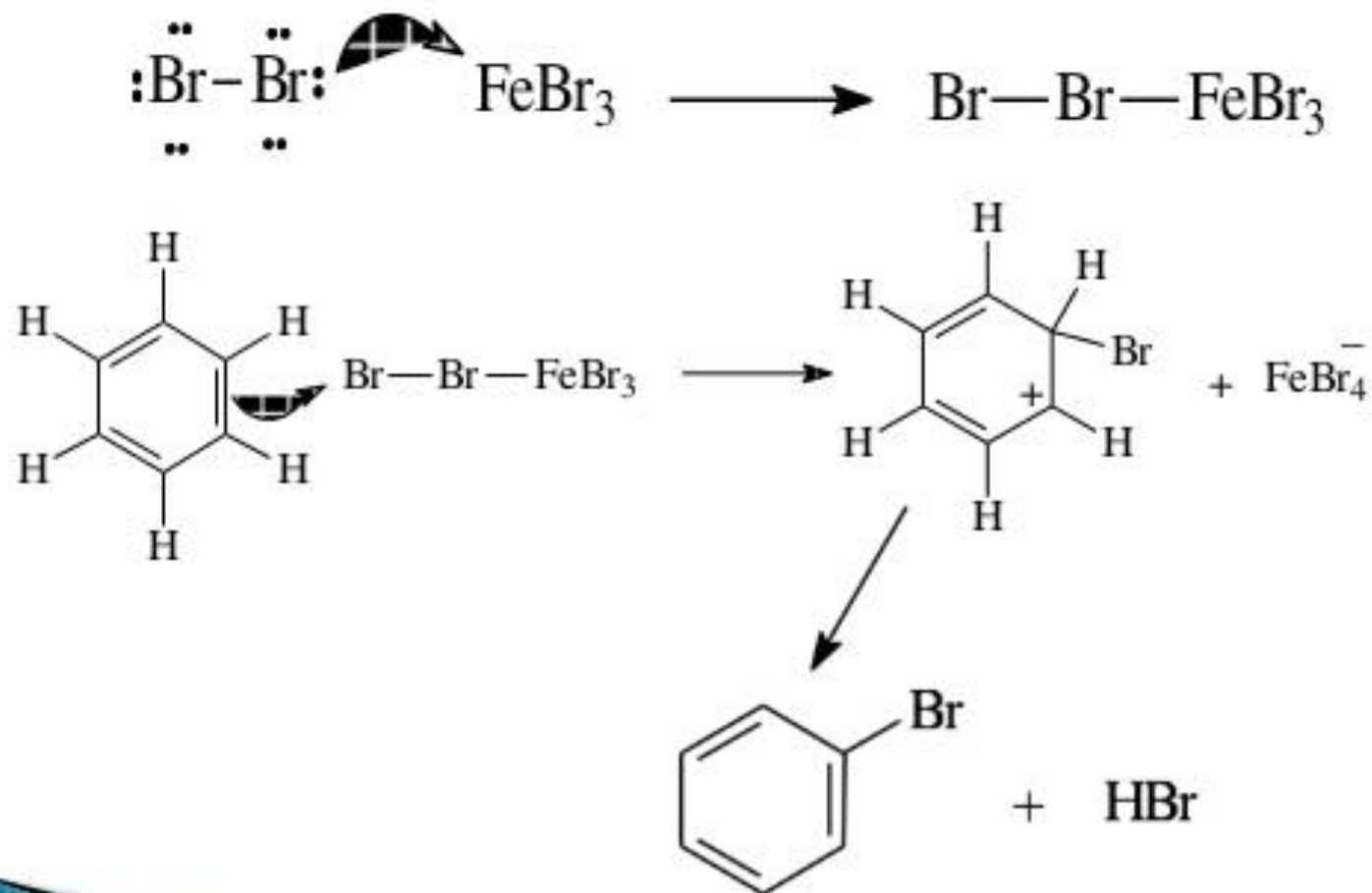
DEFINITION

- ▶ Halogenation is defined as the process in which one or more halogen atoms are introduced in into an organic compound.
 - ▶ Halogen atoms include F, Cl, Br etc.
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REACTION



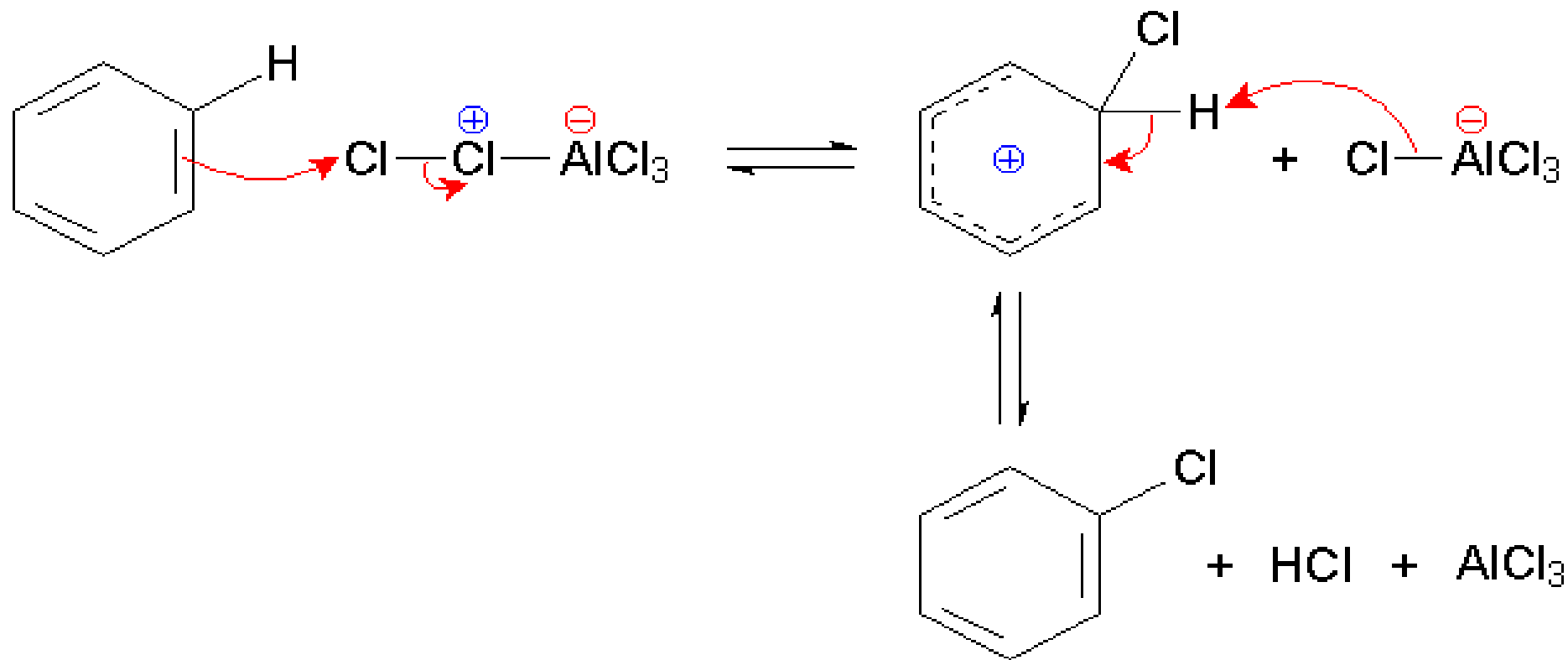
MECHANISM



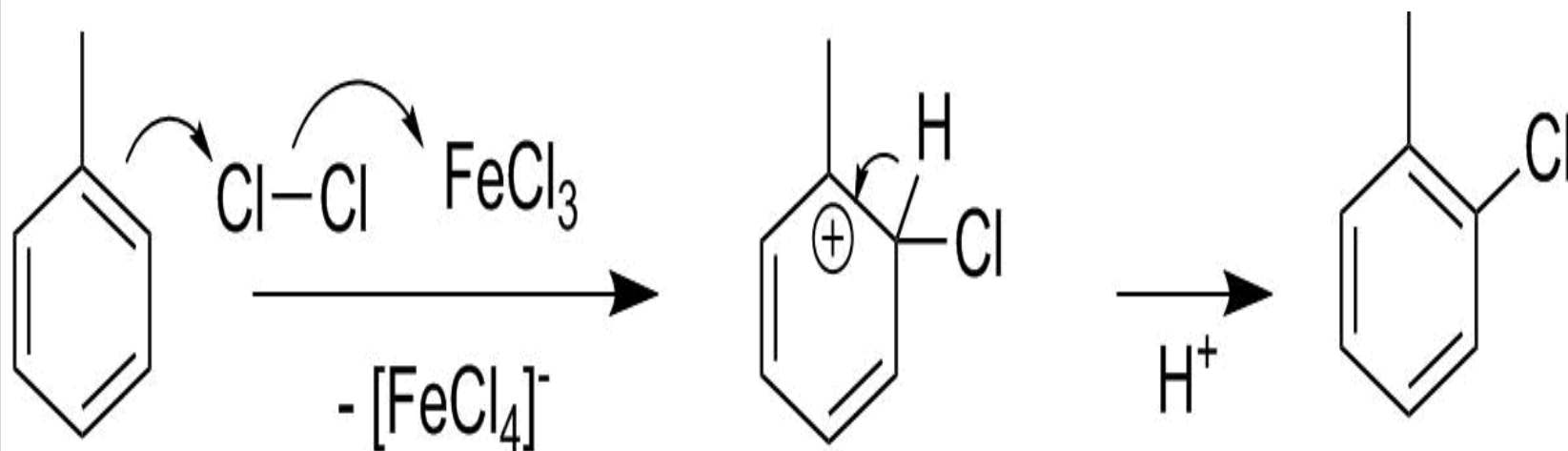
CHLORINATION

(I) DIRECT ACTION OF CHLORENE GAS

(a) CHLORINATION OF BENZENE-



(b) CHLORINATION OF TOLUENE



© CHLORINATION OF METHANE

Initiation



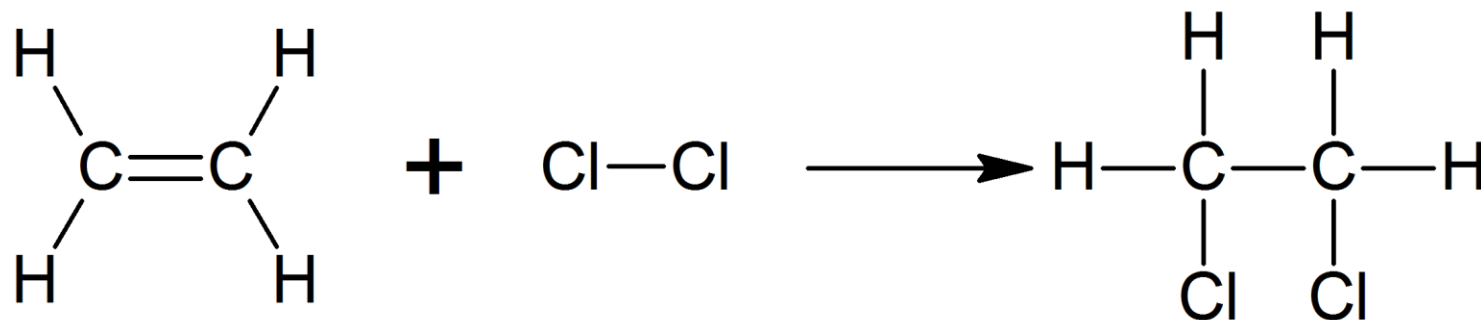
Propagation



Termination

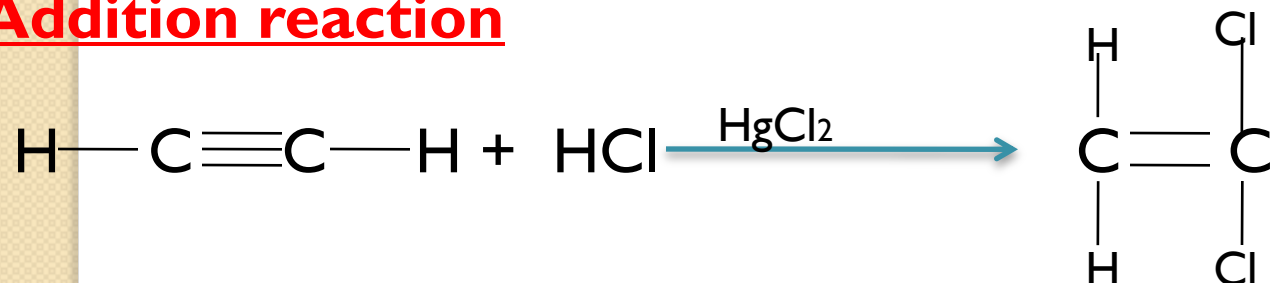


(d) CHLORINATION OF ALKENE



(2) HYDROCHLORIC ACID AS THE CHLORINATING AGENT

(a) Addition reaction



(b) SUBSTITUTION REACTION



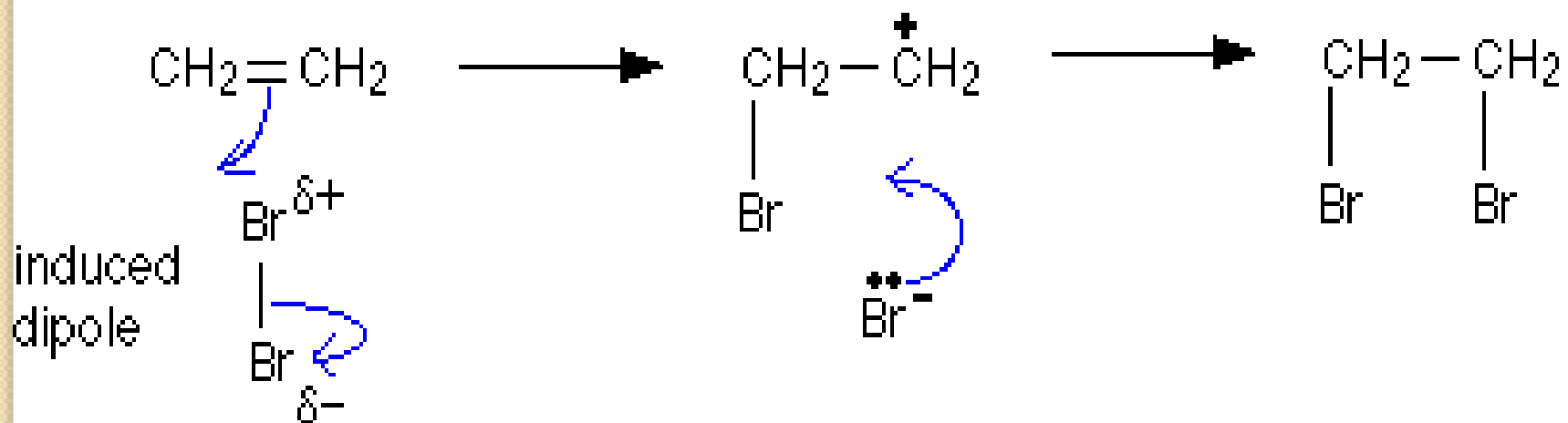
(3) CHLORINATION WITH THIONYL CHLORIDE



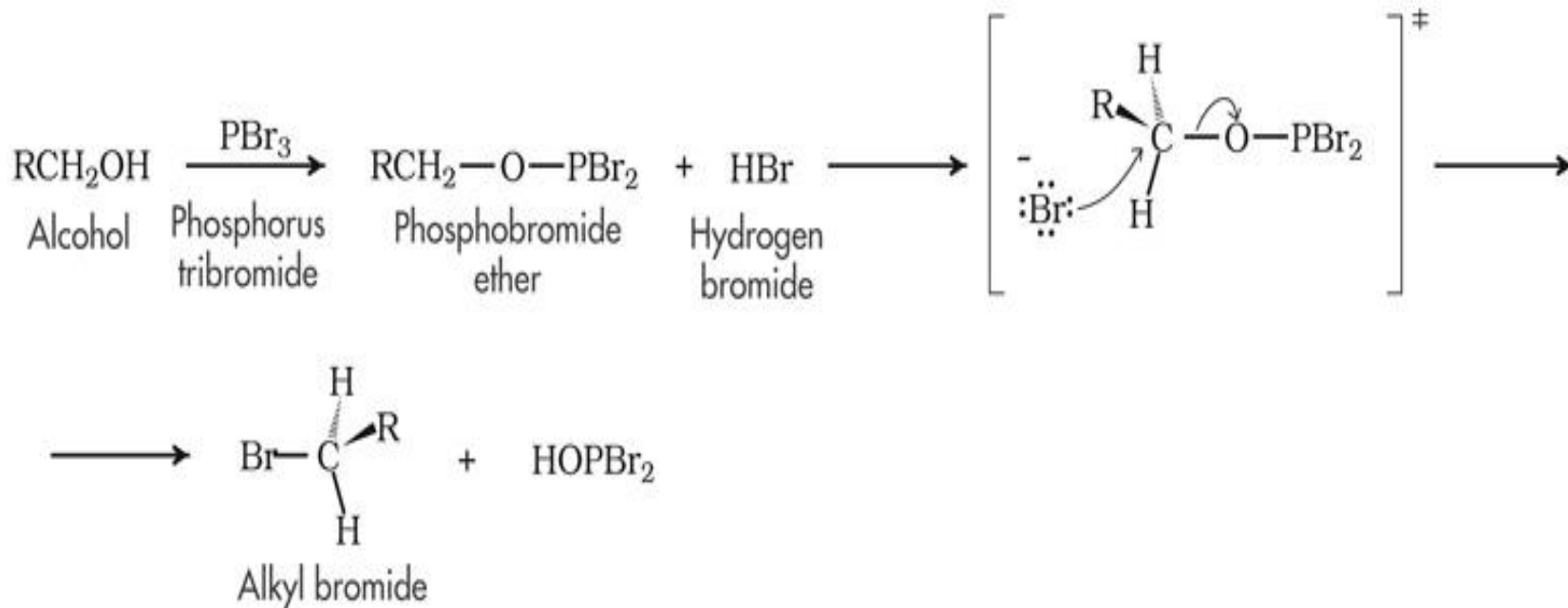
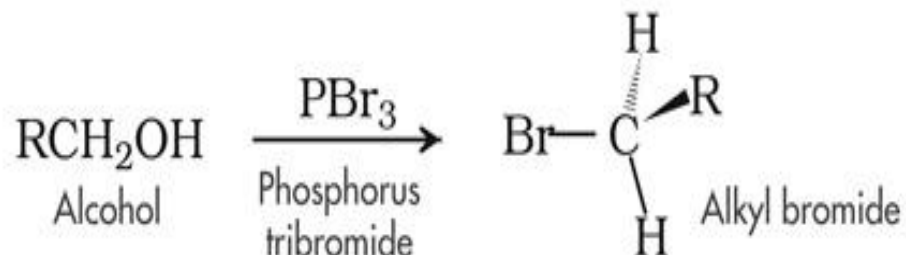
BROMINATION REACTION

- Bromene, bromides, bromates, and alkaline hypobromites are used as brominating agent.

e.g. – (a) Addition bromination or addition reaction-



(b) REPLACEMENT REACTION

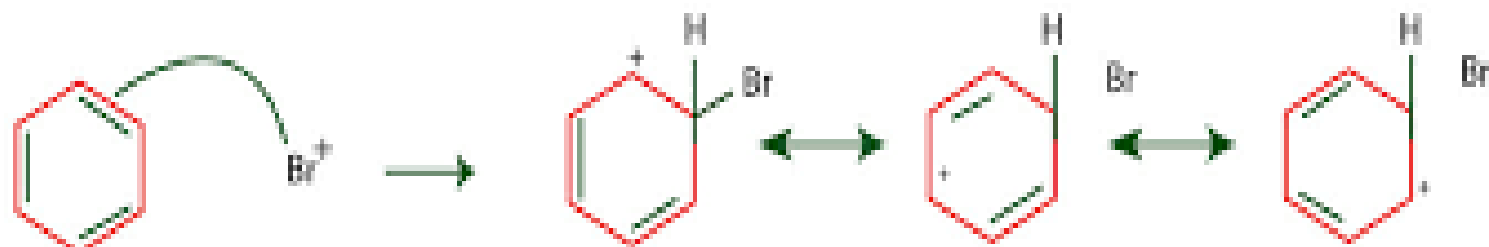


BROMINATION OF BENZENE

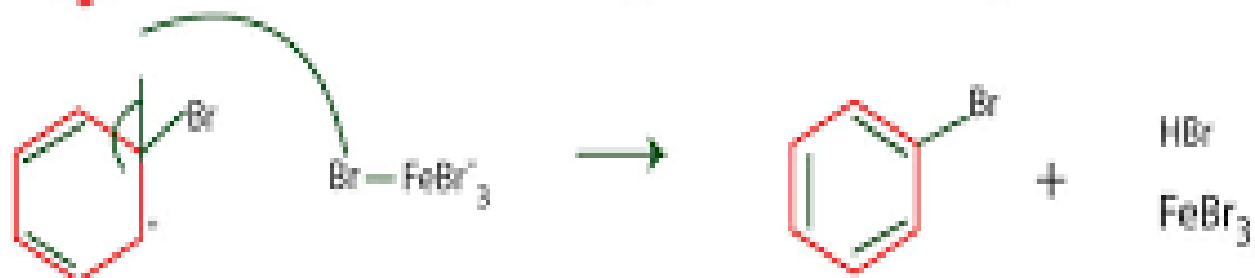
Step 1



Step 2



Step 3



PHOTOHALOGENATION

- Photohalogenation can be broadly defined as the effect of electromagnetic radiation on halogenation reaction and includes which may be produced by all wavelengths from those of radio waves through X-rays, gamma rays, etc in to cosmic rays.
- When radiation is absorbed by molecules, they are either raised to higher energy levels or dissociated.
- The molecule in higher energy level may suffer several different fates, including dissociation, loss of energy by collision, loss of energy through molecules at collision.
- The amount of energy required to rise a molecule to a higher energy level is called a quantum.
- Formula for quantum = $h \times \text{constant} / \text{wavelength in cm.}$

Halogen	Energy of dissociation into two normal atoms, ev	Equivalent wavelength, Å	Minimum frequency to form an excited atom, Å
Chlorine.....	2.480	5,000	4,785
Bromine.....	1.970	6,288	5,100
Iodine.....	1.542	8,000	4,980
HCl.....	4.300	2,800	2,500
HBr.....		3,350	?
HI.....		3,850-4,100	?

THANK

YOU