

Chemguide – questions

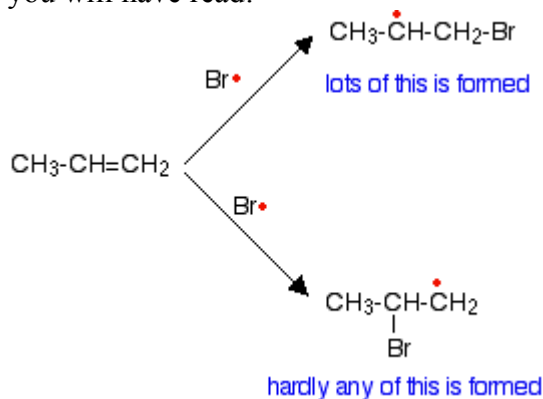
THE PEROXIDE EFFECT – HBr and ALKENES

- In the presence of organic peroxides (which form radicals **R-O**, where R represents a variety of possible groups), hydrogen bromide reacts with ethene via a free radical addition mechanism.
 - The initiation stage of the reaction involves a reaction between **R-O** and an HBr molecule. Write the equation for that reaction.
 - Write equations to show the propagation steps of the reaction.
 - Explain what happens to terminate the chain reaction.
- In the absence of organic peroxides, hydrogen bromide reacts with ethene using a mechanism which involves ions rather than free radicals. The other hydrogen halides (HF, HCl and HI) always use this alternative mechanism because the energetics of the free radical mechanism are wrong for them.

Explain why it is energetically unfavourable for HF to use the free radical mechanism.

- With an unsymmetrical alkene like propene, $\text{CH}_3\text{CH}=\text{CH}_2$, there are two possible reaction products depending on which end of the double bond the bromine and hydrogen attach to. You could get either $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ or $\text{CH}_3\text{CHBrCH}_3$.

Which you get depends on where the bromine radical attaches. The following diagram comes from one of the Chemguide pages you will have read:



- Explain why you get a lot more of the top radical than the bottom one.
- Write an equation for the reaction of the top radical to complete the propagation stage of the reaction.