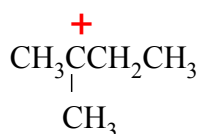
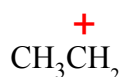


Chemguide – questions

ALKENES: REACTIONS WITH HYDROGEN HALIDES

1. State Markovnikov's Rule.
2. Show the structural formulae for the main product of each of the following addition reactions between various alkenes and a hydrogen halide. (This question is also testing your ability to write the structures for alkenes given their names. If you can't do that, get it sorted out before you continue!)
 - a) ethene and hydrogen bromide
 - b) but-2-ene and hydrogen chloride
 - c) but-1-ene and hydrogen chloride
 - d) propene and hydrogen iodide
 - e) 2-methylbut-2-ene and hydrogen iodide
 - f) but-1-ene and hydrogen bromide where everything is pure
 - g) but-1-ene and hydrogen bromide in the presence of oxygen or organic peroxides
3.
 - a) How does the rate of the reaction change as you go along the series HF – HCl – HBr – HI?
 - b) Briefly explain the trend you have given in part (a).
 - c) How does the rate of reaction change as you go from ethene to propene to 2-methylbut-2-ene?
 - d) Alkyl groups (like methyl and ethyl groups) have a tendency to “push” electrons away from themselves towards the double bond.
 - (i) How does this help to explain the way the attractiveness of the double bond varies from ethene to propene to 2-methylbut-2-ene?
 - (ii) The mechanism for the reactions involves the formation of intermediate ions with the positive charge on a carbon atom (carbocations). The intermediate carbocations in these cases would be



Why does this help to explain the variation in reactivity that you should have given in part (c)?