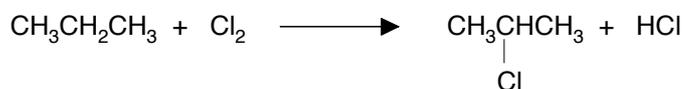


Chemguide – questions

BOND ENTHALPIES

- The bond dissociation enthalpy of the Br-Br bond is $+193 \text{ kJ mol}^{-1}$. Explain exactly what this means.
 - The mean bond enthalpy of the C-H bond in methane is $+415.5 \text{ kJ mol}^{-1}$. Explain exactly what this means, and how it is different from the bromine case in part (a).
 - Why might you expect the strength of a C-H bond in ethane, $\text{CH}_3\text{-CH}_3$, to be slightly different from its strength in ethene, $\text{CH}_2=\text{CH}_2$?
- Propane and chlorine react in the presence of UV light to give 2-chloropropane amongst other things:



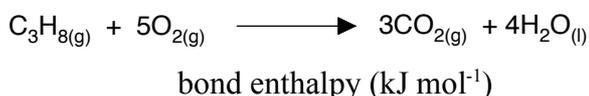
- Assuming that the reaction is carried out at a temperature where everything is gaseous, estimate the enthalpy change of reaction from the following bond enthalpies.

bond enthalpy (kJ mol^{-1})

C-H	+413
Cl-Cl	+243
C-Cl	+346
H-Cl	+432

(I haven't forgotten to give you a value for C-C. That's deliberate.)

- If the reaction was carried out at 298 K (the standard temperature), the 2-chloropropane would actually be a liquid. The enthalpy change of vaporisation of 2-chloropropane is $+27 \text{ kJ mol}^{-1}$. Calculate the standard enthalpy change of the reaction.
- Calculate the standard enthalpy change of combustion of propane, given by the equation:



C-H	+413
C-C	+347
O=O	+498
C=O (in CO_2)	+805
O-H	+464

Enthalpy change of vaporisation of water = $+41 \text{ kJ mol}^{-1}$.