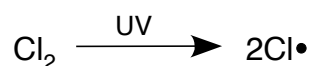


Chemguide – questions

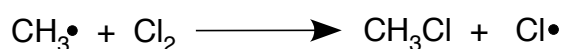
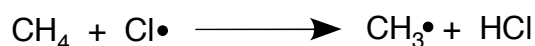
FREE RADICAL SUBSTITUTION

1. What do you understand by the following terms?
 - a) free radical
 - b) photochemical reaction
 - c) chain reaction
2. The free radical substitution reaction between methane and chlorine to produce chloromethane and hydrogen chloride goes through the following reactions:

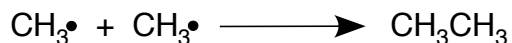
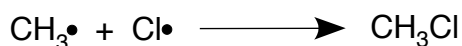
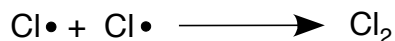
Initiation:



Propagation:



Termination:



- a) Explain in words what is happening at each of these stages, including the significance of the words *propagation* and *termination*.
- b) The rest of this question assumes that you know about multiple substitution.

Chloromethane undergoes further substitution to give dichloromethane, CH_2Cl_2 , trichloromethane, CHCl_3 , and tetrachloromethane, CCl_4 .

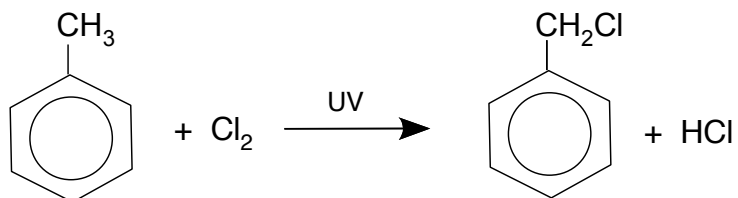
Write the equations for the propagation reactions which result in the formation of

- (i) dichloromethane from chloromethane;
- (ii) trichloromethane from dichloromethane;
- (iii) tetrachloromethane from trichloromethane.

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3. This question concerns the substitution of hydrogen by chlorine in the methyl group of methylbenzene. If you haven't actually needed to read the page about methylbenzene, try it anyway. That's why you are learning about mechanisms – so that you can work out what would happen in an unfamiliar case.

The reaction we are concerned with is:



Write the mechanism for this reaction in the following stages:

- Write the equation for the initiation reaction, explaining why UV light is involved.
- Write the equations for the propagation reactions.
- Write the equations for any *two* chain termination reactions.