THE PEROXIDE EFFECT – HBr and ALKENES

1. a) $RO\bullet + HBr \longrightarrow ROH + Br\bullet$

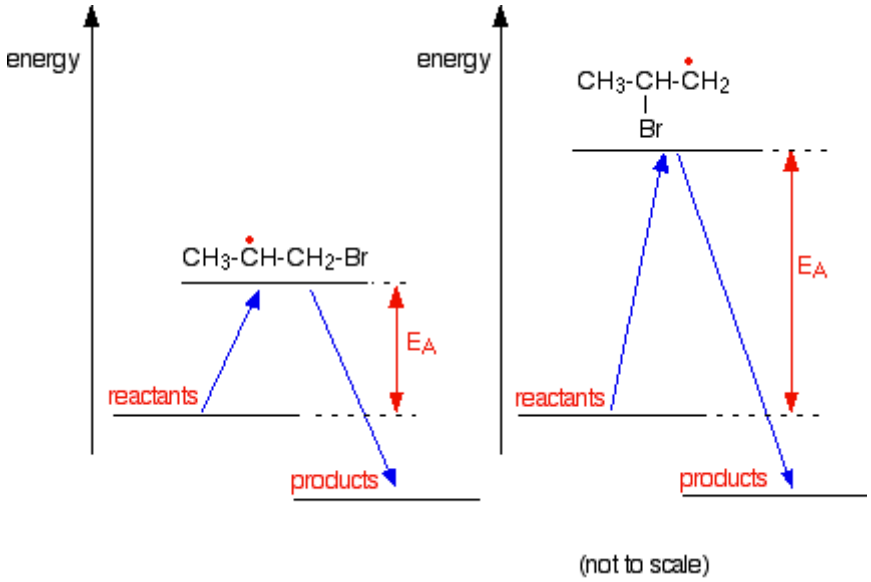
   b) $CH_2{=}CH_2 + Br\bullet \longrightarrow \bullet CH_2CH_2Br$

   $\bullet CH_2CH_2Br + HBr \longrightarrow CH_3CH_2Br + Br\bullet$

   c) Two radicals combine together without producing a new one.

2. The hydrogen-fluorine bond is very strong. To get a fluorine radical formed with a similar equation to 1(a) needs too much energy to break the H-F bond.

3. a) This is much more easily explained using the diagram from the Chemguide page:



   The radical on the left (with the single electron on the middle carbon atom – a secondary radical) is more energetically stable than the other one (a primary radical). To produce this intermediate radical from the reactants needs less energy than the one on the right. Relatively few collisions will have enough energy to produce the radical on the right.

   (The left-hand reaction involves a secondary radical – one in which the single electron is on a carbon atom attached to two other carbons. At this stage, explaining why secondary radicals are more stable than primary ones is quite tricky. You will have to just accept it as a fact.)

   b) $CH_3\dot{C}HCH_2Br + HBr \longrightarrow CH_3CH_2CH_2Br + Br\bullet$