

Chemguide – questions

RATES OF REACTION - COLLISION THEORY

1. Ethene, $\text{CH}_2=\text{CH}_2$, has a high electron density around the carbon-carbon double bond. Hydrogen chloride is a polar molecule because chlorine is more electronegative than hydrogen, and so the bonding pair of electrons is attracted towards the chlorine end of the molecule. Using this as an example, explain why the orientation of the molecules during a collision is important in determining whether a reaction happens or not.
2.
 - a) What do you understand by the *activation energy* of a reaction.
 - b) Draw a simple energy profile for an exothermic reaction in which 100 kJ mol^{-1} is evolved, and which has an activation energy of 50 kJ mol^{-1} .
 - c) Draw a simple energy profile for an endothermic reaction in which 50 kJ mol^{-1} is absorbed and which has an activation energy of 100 kJ mol^{-1} .
 - d) Why do reactions have an activation energy?
3.
 - a) Sketch the Maxwell-Boltzmann Distribution for a gas showing how the number of molecules having a particular energy changes with the energy.
 - b) Mark a point towards the right-hand side of your graph to represent the activation energy, and show on your graph how you would find the number of particles having enough energy to react when they collide.