

HW 8 Collision theory

Not every molecular interaction will result in a chemical reaction.



A and B have to collide with each other in order for them to react. For the reaction to proceed and this collision to be successful, two conditions should be present: 1. The energy of this 'hit' (collision of the molecules) should be big enough, and 2. the molecules must have proper orientation. Not all collisions result in a reaction. The collision must involve more than a certain amount of energy, known as activation energy (E_a). A collision that results in a reaction is called an effective collision. We can activate molecules to increase the number of molecules fitted to do the reaction; for example, we can heat a flask.

Each chemical reaction has its own energy barrier (activation energy). The lower the energy, the faster the reaction will proceed. If the E_a is too high, there are no molecules in the system that are able to overcome the barrier, and the reaction will not occur."

Questions:

1. Imagine a planet where the activation energy (E_a) for any chemical reaction equals zero. Would life on the planet be possible? Explain your answer.

2. Consider two reactions: the combustion of methane and the corrosion of an iron pipe. Which reaction has a larger E_a ? What do you think, and why?
3. How much grams of MgCl_2 in 100 ml of solution you have to dissolve to get 0.5 mol/L concentration of MgCl_2 .