

Energy Ws #1: Reaction Rates

1. Chemical reactions occur when reactants collide. For what reasons may a collision fail to produce a chemical reaction?

Not enough energy or at the wrong angle in a collision.

2. If every collision between reactants lead to a reaction, what determines the rate at which the reaction occurs?

The number of collisions.

3. What is the activation energy of a reaction, and how is this energy related to the activated complex of the reaction?

The activation energy is the amount of energy needed to form the activated complex.

4. What happens when a catalyst is used in a reaction?

The speed up reactions

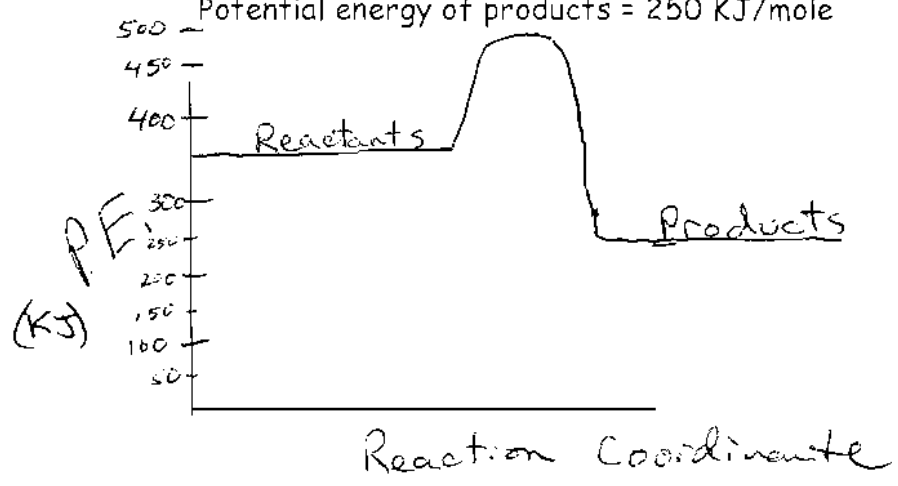
5. Name 4 things that will speed up or slow down a chemical reaction. change

- 1) concentration
- 2) temperature
- 3) Pressure/volume

- 4) Surface area
- 5) use of a catalyst

6. Draw an energy diagram for a reaction. (label the axis)

Potential energy of reactants = 350 KJ/mole
 Activation energy = 100 KJ/mole
 Potential energy of products = 250 KJ/mole

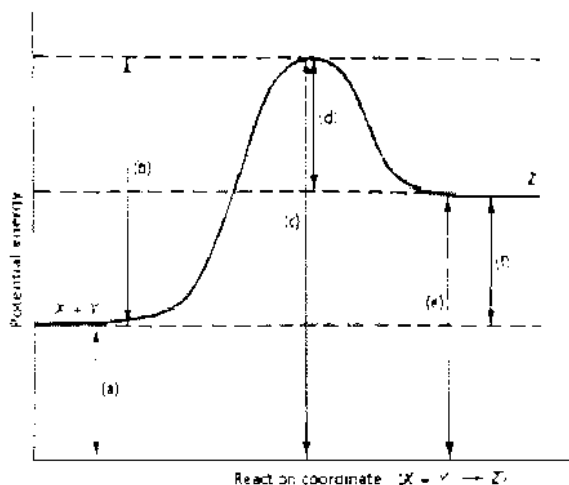


7. Is the reaction in # exothermic or endothermic? Explain.

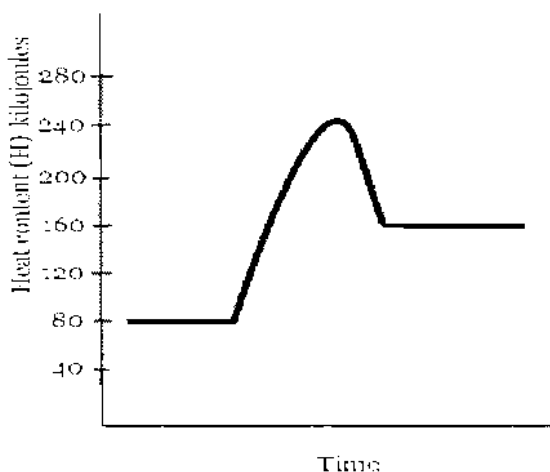
because the products have $100 \frac{\text{kJ}}{\text{mol}}$ less energy than the reactants.

8. How could you lower the activation energy for the reaction in #6?

You could use a catalyst to lower the activation energy.



1. Which of the letters a-f in the diagram represents the potential energy of the products? e
2. Which letter indicates the potential energy of the activated complex? c
3. Which letter indicates the potential energy of the reactants? a
4. Which letter indicates the activation energy? b
5. Which letter indicates the heat of reaction? f
6. Is the reaction exothermic or endothermic? endo
7. Which letter indicates the activation energy of the reverse reaction? d
8. Which letter indicates the heat of reaction of the reverse reaction? f
9. Is the reverse reaction exothermic or endothermic? exo



1. The heat content of the reactants of the forward reaction is about 80 kilojoules.
2. The heat content of the products of the forward reaction is about 160 kilojoules.
3. The heat content of the activated complex of the forward reaction is about 240 kilojoules.
4. The activation energy of the forward reaction is about 160 kilojoules.
5. The heat of reaction (ΔH) of the forward reaction is about +80 kilojoules.
6. The forward reaction is endo (endothermic or exothermic).
7. The heat content of the reactants of the reverse reaction is about 160 kilojoules.
8. The heat content of the products of the reverse reaction is about 80 kilojoules.
9. The heat content of the activated complex of the reverse reaction is about 240 kilojoules.
10. The activation energy of the reverse reaction is about 80 kilojoules.
11. The heat of reaction (ΔH) of the reverse reaction is about -80 kilojoules.
12. The reverse reaction is exo (endothermic or exothermic).