

Kinetics and Equilibrium



Name _____

Test Date _____

Collision Theory

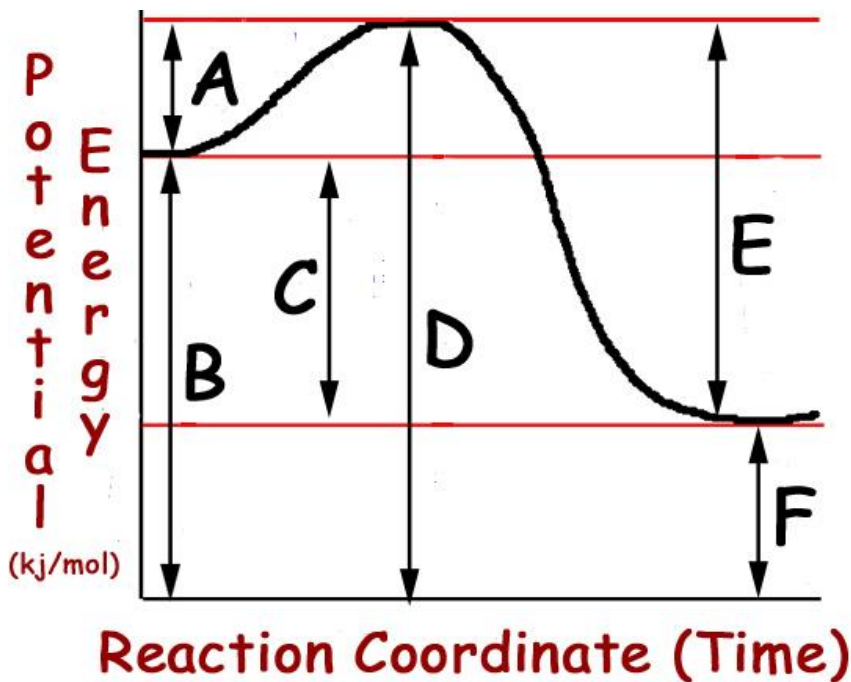
Assumptions of the Collision Theory:

- 1)
- 2)
- 3)

Factors that Affect Reaction Rates

- 1) Nature of Reactants:
- 2) Concentration
- 3) Surface Area
- 4) Temperature
- 5) Catalyst

Label the parts of a potential energy diagram:



Is the Potential Energy Diagram above exothermic or endothermic?

Draw an endothermic Potential Energy Diagram:



Draw a potential energy diagram with a catalyst added:



Equilibrium

Terms to know:

Reversible Reaction:

Chemical Equilibrium:

Law of Chemical Equilibrium:

Equilibrium Constant Expression (K_{eq})

Definition:

Generic reaction:

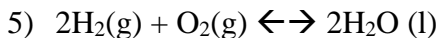
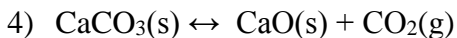
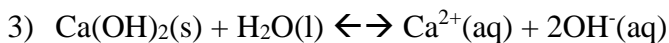
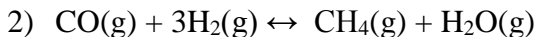
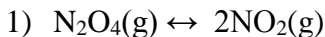
Formula:

Do not put _____ and _____ in the K_{eq} equations!

When K_{eq} is > 1 _____

When K_{eq} is < 1 _____

Try It! Practice Problems



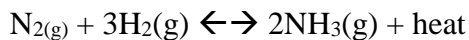
Le Chatelier's Principle: _____

Types of Stress:

- 1)
- 2)
- 3)

Changing Concentration:

Try it!



What happens to the reaction if you increase the concentration of N_2 ?



Describe what happens when:

You decrease SO_2

You increase O_2

Changing Temperature:

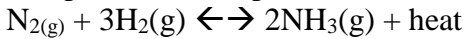
Where is heat added for an **endothermic** reaction?

Where is heat added for an **exothermic** reaction?

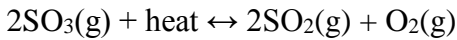
K_{eq} is only affected by a _____ change

Treat heat the same way you do concentration changes. If temperature increases, heat increases!

Temperature Examples:



What happens to the reaction if you increase the temperature?



a) Increase the temperature

b) Decrease the temperature

Changing Pressure

*Only affects equilibrium reactions with _____.

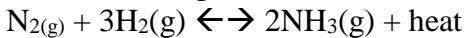
*When you increase pressure (_____) you want
_____ in your system

*When you decrease pressure (_____) you want to _____
_____ in your system.

When you **increase pressure** it always shifts toward _____
_____ of gas.

When you **decrease pressure** it always shifts toward _____
_____ of gas.

Pressure Examples:



a) Increase the pressure

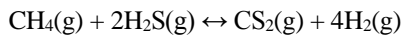
b) Decrease the pressure



a) Increase the pressure

b) Decrease the pressure

More Practice



$$\Delta H = 215.5 \text{ kJ/mol}$$

Stress	Shift	[CH ₄]	[H ₂ S]	[CS ₂]	[H ₂]	K _{eq}
Increase CS ₂						
Decrease H ₂						
Increase Temp						
Increase Pressure						