7.3 Energy Changes in Reactions

Chemical Bonds and Energy

- ____________________________ = energy stored in the chemical bonds of a substance.
- ____________________________ changes in chemical reactions are ____________________________ by changes that occur in chemical ____________________________.
- Chemical reactions involve the ____________________________ of chemical bonds in the ____________________________ and the ____________________________ of chemical bonds in the ____________________________.

Breaking Bonds

- In the equation for the combustion of propane, ____________________________ is required to ____________________________ the chemical ____________________________ between C—H, C—C, and O=O.

\[
C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + \text{Heat}
\]

Forming Bonds

- When chemical ____________________________ are ____________________________, ____________________________ is ____________________________.
- The heat and light given off by a propane stove result from the formation of new chemical bonds.
- __________ C=O double bonds and __________ O—H single bonds.

\[
C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + \text{Heat}
\]

Exothermic Reactions

- __________ is ____________________________ during an ____________________________ reaction.
- The energy ____________________________ as the ____________________________ form is ____________________________ than the energy required to ____________________________ the bonds in the reactants.
- Ex: ____________________________ Reaction

Endothermic Reaction

- __________ is ____________________________ during an ____________________________ reaction.
- __________ energy is required to ____________________________ the bonds in the ____________________________ than is released when the products are formed.
- Ex: ____________________________ Reaction

7.4 Reaction Rates

Reactions Over Time

- A ____________________________ __________ is the rate at which ____________________________ ___________ into ____________________________ over time.
- Reaction rates tell you how ____________________________ a reaction is going.
  - How fast ____________________________ are being ____________________________, how fast ____________________________ are ____________________________, or how fast ____________________________ is ____________________________ or ____________________________.

Colliding Particles...

The reaction rate of a chemical reaction ____________________________ on how ____________________________ reactant ____________________________.
If the ___________________ occur ___________ frequently, then the reaction rate _______________.

If the ___________________ occur ___________ frequently, then the reaction rate _______________.

Factors that Affect Reaction Rate

• ____________________________________________________________________
• ____________________________________________________________________
• ____________________________________________________________________
• ____________________________________________________________________
• ____________________________________________________________________

Temperature

• ________________ temperature=____________________________ reaction rate
  • ___________ temperature causes ______________ in a substance to, generally, move ______________, causing ___________ collisions and a greater chance of a reaction occurring.
  • ________________ temperature=____________________________ reaction rate

Surface Area

• ________________ surface area=____________________________ reaction rate
  • When surface area is increased, the exposure of reactants to one another is increased. This increases the ______________ among the particles that make up the reactants. More collisions leads to more particles reacting.

Stirring

• Stirring ________________ the ______________ of ______________ to _________ other which ______________ reaction rate.
  • Stirring ________________ the ______________ between particles.

Concentration

• ________________ =the number of ______________ in a given ______________.
  • ________________ the concentration=____________________________ reaction rate
  • For gases, concentration changes with pressure.
    • The greater the pressure of a gaseous reactant, the greater its concentration, which results in a faster reaction rate.

Catalysts

• Used to ________________ the reaction rate, ________________ up a reaction or ________________ a reaction to ________________ at a ________________ temperature.
  • ________________ =substance that affects the reaction rate ________________ being __________ up during the reaction.
  • Catalysts are ________________ ______________ the ________________ in a chemical equation.
  • ________________ be ______________ ______________ and ______________ in the ______________ reaction because it is __________ consumed.