FCAT Practice

Factors influencing rate of reaction

Factors that affect the rate of reaction:

Concentration: Reaction rate increases with concentration, as described by the rate law.. As reactant concentration increases, the frequency of collision increases.

Temperature: Usually conducting a reaction at a higher temperature delivers more energy into the system and increases the reaction rate by causing more collisions between particles.

A catalyst: The presence of a catalyst increases the reaction rate (in both the forward and reverse reactions) by providing an alternative pathway with a lower activation energy

Surface Area: In reactions on surfaces, the rate of reaction increases as the surface area does. That is due to the fact that more particles of the solid are exposed and can be hit by reactant molecules.

Gases under changing pressure

Boyles Law states that as pressure increases, volume of a gas decreases. Pressure and volume of a gas are indirectly proportional. $P_1V_1=P_2V_2$

Conservation of Mass/Energy

The law of conservation of mass/matter, also known as law of mass/matter conservation says that the mass of a closed system will remain constant, regardless of the processes acting inside the system. An equivalent statement is that mass cannot be created/destroyed, although it may be rearranged in space, and changed into different types of particles.

Within some problem domain, the amount of energy remains constant and energy is neither created nor destroyed. Energy can be converted from one form to another (potential energy can be converted to kinetic energy) but the total energy within the domain remains fixed.

Energy Transformations

Energy transformation, energy transfer, energy conversion or power transfer, is any process of transforming one form of energy into another. Energy of fossil fuels, solar radiation, or nuclear fuels can be converted into other energy forms such as electrical, propulsive, or heating that are more useful to people. Often, machines are used to transform energy.

Links:

http://phet.colorado.edu/simulations/sims.php?sim=Gas_Properties
http://phet.colorado.edu/simulations/sims.php?sim=Reactions_and_Rates

Vocabulary

Reaction rate
Reactants
Products
Concentration
Solution
Surface area
Temperature
Controlled variables
Independent variable
Dependent variable
Catalyst
Pressure
Activation energy

Questions

1. Would a tablet Alka Seltzer tablet dissolve faster in warm or cold water. Explain.
2. What differences would occur if a tablet was crushed? Would it dissolve faster or slower? Why?
3. Chemists are aware that concentration of substances can affect the rate that chemicals react. How does an increase in concentration affect the rate of reaction?
4. In a lab, Susan has learned that hydrogen (H2) is produced in a chemical reaction between aluminum and hydrochloric acid. Her teacher wants her to find out how to make the reaction occur faster. What changes could she make?