

Topic 8 Reaction Rate

The speed of a chemical reaction is called the **reaction rate**.

- **Temperature** of the reactants affects the rate of all reactions (The higher the temperature the faster the reaction rate)
- **Surface Area** of the reactants affects the reaction rate (The more surface in contact, the faster the reaction rate)
- **Concentration** of the reactants affects the reaction rate. (The higher the concentration, the faster the reaction rate)
- **The presence of a Catalyst** affects the reaction rate

Speeding Up a Reaction With Catalysts

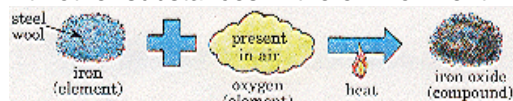
A **catalyst** is a substance that help a reaction proceed faster and are not consumed in the reaction. Types of reactions involving catalysts can be found in living and non-living things. **Enzymes** are natural catalysts that help in the reactions in the body, which break down food. They also get rid of poison in the body. **Catalase** (an enzyme found in plant and animal cells) speeds up the breaking down of hydrogen peroxide into harmless oxygen and water.

Slowing Down a Reaction With Inhibitors

Inhibitors are substances that slow down chemical reactions. Plants have natural inhibitors in their seeds to prevent germination until the right conditions are present. Inhibitors are added to foods to slow down their decomposition.

Corrosion

Corrosion is a slow chemical change that occurs when oxygen in the air reacts with a metal. Corrosion is a chemical reaction in which the metal is decomposed (eaten away), when it reacts with other substances in the environment. The corrosion of iron is called '*rusting*'.



Many metals can corrode. The green roofs of the parliament buildings are an example of corrosion. The red-brown copper color is replaced with the green color because copper corrodes. Gold does not corrode. Solid solutions of metals (alloys) resist corrosion.

Preventing Corrosion

Corrosion protection (e.g. painting the metal) involves protecting metal from contact with the environment and the factors that affect the reaction rate of this chemical reaction. Coating a corrosive metal with a thin layer of zinc is called **galvanization**. The process of coating a corrosive metal with another metal through electrolysis (review p.110) is called **electroplating**.

Combustion

Combustion is the highly exothermic combination of a substance with oxygen. Combustion requires heat, oxygen, and fuel.

Products of Combustion

The burning of propane (C_3H_8) in a barbeque is an exothermic reaction that produces heat to cook the food. If the heat is too intense, the products being cooked will be changed into pure carbon (the meat will be burnt). The products of combustion are not always beneficial. Burning fossil fuels (such as propane) produces carbon monoxide, carbon dioxide, sulfur oxides, nitrogen oxides, smoke, soot, ash and heat. Some of these products are **pollutants** which will be covered in more detail in Environmental Chemistry – Unit C.

