Exothermic Changes of State

The changes of state that release energy (heat) are freezing, condensation, and deposition. In the next few sections we will examine how each of these processes works.

Freezing

The change of state from a liquid to a solid is called freezing, or **solidification**. This change is accomplished by removing heat energy from the substance. The heat that is removed is radiated into the surroundings, so we say heat is *released* during this process.

As a liquid cools, its particles will slow down. If they slow down enough, the intermolecular forces will draw them closer together. If they get close enough to one another, they will be unable to move around as freely, and will become solid.

Condensation

The change of state from a gas or vapor to a liquid is called condensation. This change is also accomplished by removing heat energy from the substance.

Condensation is the opposite of vaporization. It occurs because, as a gas or vapor cools down, its particles lose energy (they slow down). If the particles slow down enough, the intermolecular forces will draw them closer together and form bonds. Once bonds form, the vapor will change to the liquid state.

Deposition

Deposition is the process by which a gas changes directly to a solid, without first becoming a liquid. Examples of deposition include the formation of snow in clouds, the formation of ice crystals on your car windshield in the winter, and the formation of frost on the ground.

Deposition occurs when a gas or vapor is exposed to temperatures below its freezing point.

Worksheet

1. Define each of the following.

    a) condensation
    b) deposition
    c) freezing