Name: _____ Per: _____

Carbon 12.011 C 6

Worksheet Done In-Class 9/20

Describing Matter

Properties and Changes in Matter

Every substance has characteristic properties. Chemists use properties to distinguish between different substances. Properties can help reveal the identity of an unknown substance. Comparisons of several properties can be used together to establish the identity of the unknown.

Chemists also use properties to separate different substances that are mixed together. For example, a mixture of iron and aluminum shavings can be separated using the magnetic property of iron. The iron shavings are attracted to a magnet and the aluminum shavings are not.

Extensive properties depend on the amount of matter that is present. The volume of an object is an extensive property because it changes when material is added to, or taken away from, an object. Extensive properties include the volume, mass, and amount of energy in an object.

In contrast, **intensive properties** do not depend on the amount of matter present. Such properties include melting point, boiling point, and density. Intensive properties are the same for two samples of a substance even if the samples are different in size.

Physical Properties and Physical Changes

A **physical property** can be observed or measured without changing the identity of the substance. Physical properties describe the substance itself, rather than describing how it can change into other substances. One physical property of a substance is its boiling point. Liquid water boils into water vapor at 100°C (373 K or 212°F).

The boiling point of water is a physical property and an intensive property.

A change in a substance that does not involve a change in the identity of the substance is called a **physical change.** Examples of physical changes include grinding, cutting, melting, and boiling. These types of changes do not change the identity of the substance present.

Chemical Properties and Chemical Changes

Physical properties can be observed without changing the identity of the substance. However, the chemical properties of a substance cannot be observed without changing its identity. A **chemical property** relates to a substance's ability to undergo changes that transform it into different substances.

A **chemical change** is a change in which one or more substances are converted into different substances. The substances are said to react with one another to form the new substance or substances. Therefore, a change in which at least one new substance is formed is called a **chemical reaction.**

The chemical properties of a substance are easiest to see when the substance is involved in a chemical reaction. For example, the rusting of iron when combined with the oxygen in air is a chemical property.

Define the following:

Physical Property-

Physical Change-

Chemical Property-

Chemical Change-

Sort the following (A-Y) into four different categories: Physical property, Chemical Property, Physical Change, Chemical Change by writing the term or process in the correct box below.

Carbon dioxide gas being generated sublimation of dry ice A	boiling point F	extrinsic property K	tearing styrofoam into smaller pieces P	recording lab data U
Mass B	melting plastic at low temperature G	burning paper L	Intrinsic property Q	Density V
a nail rusting to form iron oxide C	Carbon dioxide gas being generated by the decomposition of sodium carbonate as it is heated. H	reaction to water M	Volume R	Acidic or Basic W
The formation of a yellow precipitate when two colorless transparent liquids are mixed. D	metal, non-metal, or metalloid I	releasing hairspray into the air (liquid to gas) N	water freezing to form ice S	Color X
Luster or shininess E	dissolving sugar into water J	temperature O	neutralizing baking soda T	flammability Y