Types of Change

Physical Change vs Chemical Change

Define **Physical Change** and give some examples:

• changes affecting the form of a chemical substance
• are used to separate mixtures into their component compounds

Define **Chemical Change** and give some examples:

• sometimes irreversible chemical rxn involving the rearrangement of atoms of 1 or more substances
• results in a change in their chemical properties
• results in the formation of a new substance

1) Heating Iodine

The formula for iodine is I_2 (diatomic molecule).

Iodine is a solid at room temperature.

Its colour is dark purply - black

Place the sealed tube of iodine into a hot water bath. This adds heat energy to the iodine.

This is an endo - thermic process.

What happened as a result of heating the iodine?

a purple vapour formed

Write the equation for what happened to the iodine using proper subscripts:

$I_2(s) + HE \rightarrow I_2(g)$

This was a physical change because no new substance was made => only a change of state

Was anything new made? No!

2a) Iron and Sulfur--The Mixture

Describe iron filings (Fe) greyish pieces of metal

Describe sulfur (S_8) yellow powder

What is special about iron? it is ferromagnetic

What does a mixture of iron and sulfur look like? yellow - greyish amorphous mixture

The mixing of iron and sulfur is a physical change because no new substances were made & it could be separated using a magnetic

Mechanical mixtures like iron and sulfur can be separated by physical means.

How can iron and sulfur be separated and why? use a magnet to attract the ferromag iron filings

2b) Heating a mixture of Iron and Sulfur

What happened as the mixture of iron and sulfur was heated? • glowed red hot

• gases given off

What did the resulting product look like? greyish rock

Explain what happened and why with the magnet and the product. no attraction to the magnet = no longer iron ⇒ new substance

BCE $8Fe_{(s)} + S_{8(s)} \xrightarrow{\Delta} 8FeS_{(s)}$

3) Mixing Calcium Carbonate and Hydrochloric Acid

Describe the marble chips ($CaCO_3$) whitish rocks

Describe HCl C & C soln

Add one or two marble chips to a test tube containing a few mL of hydrochloric acid.

What evidence was there that a chemical change took place? bubbling

Insert a plastic pipet just over the reaction and squeeze to suck up (aspirate) some of the gas being produced.

Release the gas into a test tube containing limewater.

What happened and why? C & C LW → cloudy

BCE $CaCO_3(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + CO_2(g) + H_2O(l)$

4) Mixing Calcium Chloride and Sodium Hydroxide Solutions

Describe the ~~Ca(OH)~~$_2$(aq) solution clear & colorless

Describe the NaOH(aq) solution clear & colorless

Add 4 drops of calcium chloride to 4 drops of sodium hydroxide.

What evidence of chemical change occurred? ppt = precipitate = formation of a solid

BCE $CaCl_2(aq) + 2NaOH(aq) \rightarrow Ca(OH)_2(s) + 2NaCl(aq)$

5) Burning Magnesium--tomorrow's lab! physical or chemical?