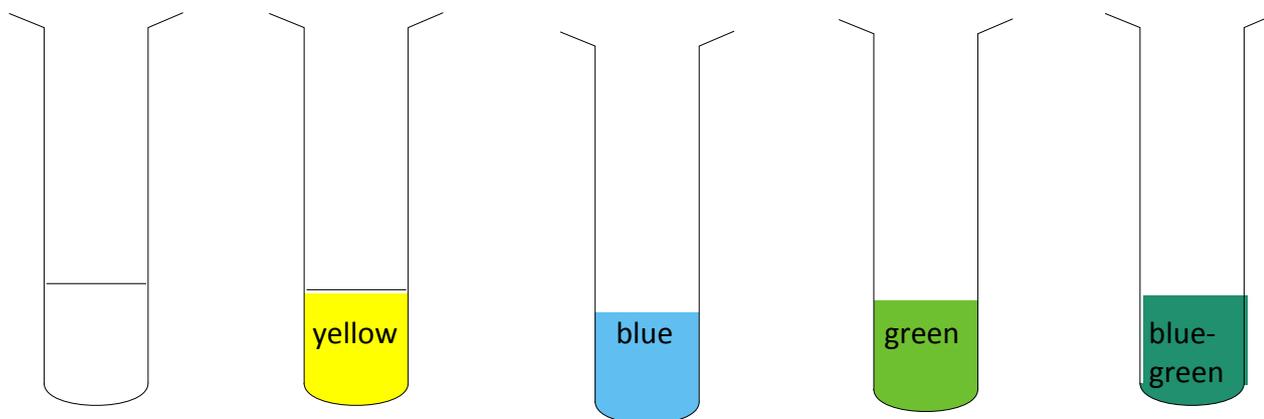


## AS90934 Demonstrate understanding of aspects of chemical reactions

### Colours and observations to know!

#### Colours of precipitates!

Learn them all as being white except for.....



silver chloride

lead iodide

copper hydroxide

iron(II) hydroxide

copper carbonate

lead chloride

iron(II) carbonate\*

calcium sulfate

barium sulfate

lead sulfate

calcium hydroxide

barium hydroxide

magnesium hydroxide

calcium carbonate

barium carbonate

zinc carbonate

lead carbonate

\*some websites describe iron(II) carbonate as greeny-grey

#### Colours of solutions!

Learn them all as colourless (NOT "clear") except

copper sulfate, copper nitrate – blue

copper chloride – greeny-blue

iron(II) sulfate – pale green

#### Colours for decomposition reactions!

copper carbonate

copper hydroxide

copper oxide

iron(II) carbonate

iron(II) oxide

green

blue

black

green/greeny-grey

black

All other oxides, hydroxides, carbonates and hydrogen carbonates that you are likely to meet are white.

Exception: yellow lead oxide. And zinc oxide is yellowy-green when hot – and then cools to a white solid.

### Colours of metals!

Metals are silvery / silvery grey / dark grey except..... copper (pinky orange). But copper metal formed in a displacement reaction often appears reddy-brown.

### Colours of gases!

Oxygen, hydrogen and carbon dioxide are all colourless gases (NOT CLEAR).

Don't say "see bubbles of carbondioxide..." but say see "bubbles of a colourless gas"

### Tests for gases, and water!

Hydrogen; gas burns with a squeaky pop.

Carbon dioxide; gas turns colourless limewater cloudy/milky.

Oxygen; gas relights a glowing splint.

Water; turns blue cobalt chloride paper pink.

### Other!

Hydrogen peroxide is a colourless liquid.

Manganese dioxide is a black solid that catalyses the decomposition of hydrogen peroxide into water and oxygen gas.

### Combination reactions!

These could cover pretty much anything since the AS does not give a list ☹

Some substances worth knowing might be:

- Magnesium; silvery grey metal – burns with bright white light to make a grey-white ash of MgO
- Sulfur; yellow non-metal – burns with a blue flame to make a colorless gas with a suffocating, choking odour, SO<sub>2</sub>
- Carbon; black non-metal – burns with yellowy flame to make a colourless gas CO<sub>2</sub>
- Iron + sulfur; react when heated – glows and makes a black non-magnetic solid of FeS
- Hydrogen; colourless gas + O<sub>2</sub> will explode with a small flame - to make a colourless liquid, H<sub>2</sub>O
- Iron; (iron wool) Sparks are formed in the flame. After strong heating the solid glows red-hot and a black solid is formed. **Different sources disagree on the product**.....but the general opinion is this.....  
 $4\text{Fe}(s) + 3\text{O}_2(g) \rightarrow 2\text{Fe}_2\text{O}_3(s)$  iron(III) oxide, a black-brown solid



*However....some sources say: Strong heating is required to make iron burn in oxygen. The reaction gives out a yellow showery sparks and produces a **black** solid.*

*iron + oxygen → iron (II) oxide, iron (III) oxide (a mixed oxide)  $3\text{Fe}(s) + 2\text{O}_2(g) \rightarrow \text{Fe}_3\text{O}_4(s)$  !!!*

*Others (including NCEA back in 2004) say  $2\text{Fe} + \text{O}_2 \rightarrow 2\text{FeO}$  (black) iron(II) oxide.*

*Hopefully if they ask the question they will TELL you the name or formula of the oxide product or have the common sense to avoid this seemingly simple reaction which in reality is a bit of a mine field!! Sorry ☺*