

DEMONSTRATION 8.14

POTASSIUM CHLORATE AND SUGAR

A mixture of potassium chlorate and sugar is prepared five times with small amounts of salts added to four of them. The mixture are reacted sequentially and violent reactions occur, in which characteristic coloured flames are produced.

EQUIPMENT

- 5 small evaporating dishes
- pasteur pipette with teat
- nickel spoon and spatula
- insulating mat
- mortar and pestle

REAGENTS



- potassium chlorate, KClO_3 (30 g)
- sugar, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ (10 g)
- sulfuric acid, H_2SO_4 (18 M, 1 mL)
- barium chloride-2-water, $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ (3 g)
- strontium nitrate, $\text{Sr}(\text{NO}_3)_2$ (3 g)
- sodium chloride, NaCl (2.5 g)
- copper(II) chloride-2-water, $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ (2.5 g) (Hygroscopic, hence must prepare fresh or keep dry)

PREPARATION

- Into each of the 5 dishes weigh out 6 g of potassium chlorate and 2 g of granulated sugar. Grind it gently so as to mix the two substances together
- Exercise great care.

CAUTION



**Potassium chlorate is a strong oxidising agent.
A mixture with a flammable material becomes explosive !
Grind with non-metal implements (wood or plastic).
Do not store this mixture!
Handle with care!**

- Leave one dish with only potassium chlorate/sugar mixture.
- To the others add the following ground salts:
 $\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$ (3 g) to one dish, $\text{Sr}(\text{NO}_3)_2$ (3 g) to another, NaCl (2.5 g) to another and $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ (2.5 g) to a fourth dish.
- Place all the dishes with the mixtures on an insulating mat on the demonstration bench.
- Keep the dishes well separated.
- Supply the concentrated sulfuric acid in a small reagent bottle.
- Provide pipette, spoon and spatula.

PROCEDURE

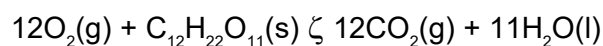
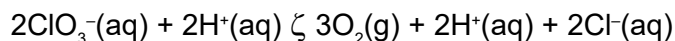
- Perform the demonstration in the fume hood.
- Dim the lecture theatre lights.
- With the spatula make a small depression in the top of each mixture.
- Using the pipette, place one drop of acid into the depression of one of the mixtures.
- Stand well back.
- After each reaction has completely ceased, add sulfuric acid (one drop) to the other dishes sequentially.

**CAUTION**

Ensure that none of the prepared mixtures are standing near the reaction site!

RESULTS

After one or two seconds, the reaction begins with the evolution of smoke. Quickly, the mixture will burst into flames.



The addition of salts of the alkali and alkali-earth metals will create different coloured flames:

K: violet

Na: intense yellow

Ba: apple green

Sr: crimson

Cu: pale green

DISPOSAL

Any residues should be flushed down the sink.

High Risk Demonstration:

- **Refer to HIRAC**
- **Set up in Red Tray**