

RS•C

61. Mass conservation

Topic

Mass conservation.

Timing

20 min.

Description

Students react potassium iodide with lead nitrate. They weigh reactants and products to show there is no mass change.

Apparatus and equipment (per group)

- ▼ Two < 100 cm³ beakers
- ▼ 10 cm³ Measuring cylinder
- ▼ Access to an accurate balance (0.01g).

Chemicals (per group)

- ▼ Potassium iodide solution 0.01 mol dm⁻³
- ▼ Lead nitrate solution 0.009 mol dm⁻³ (**Harmful**).

Teaching tips

Students get confused with errors in an experiment. This is a good opportunity to reinforce the idea of errors and that small differences do not necessarily indicate weight loss or gain. The teacher can state that if weight is gained or lost, the results would be repeatable, and therefore the same for all groups in the class.

Emphasise the process of not trying to weigh exact amounts of reactants, you simply require an accurate mass.

Background theory

Accuracy in measurements, errors, and repeatability.

Safety

Wear eye protection. Ensure students wash their hands thoroughly after the experiment.

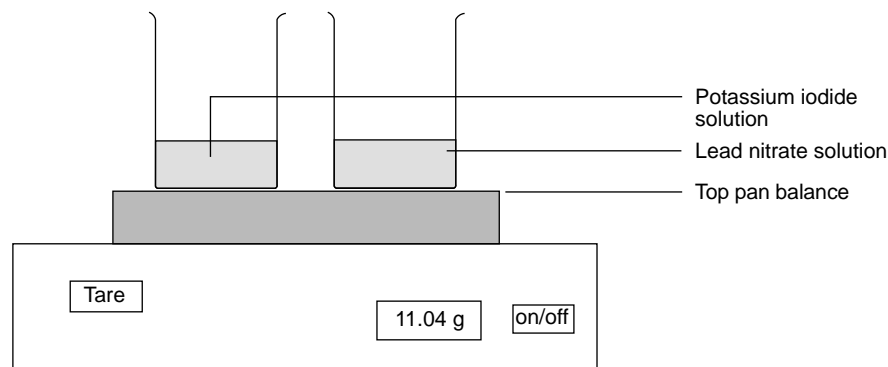
Answers

1. Yes, this is confirmed by the colour change.
2. Potassium iodide + lead nitrate → potassium nitrate + lead iodide
3. Although at some degree of accuracy the experiment appears to show a mass change this is within the limits of experimental error and these results tend to indicate no mass change.

Mass conservation

Introduction

The aim of this experiment is to show that mass is not gained or lost in a chemical reaction.



What to record

Record the total mass of the reactants and the products.

What to do

1. Measure approximately 5 cm^3 of potassium iodide in the measuring cylinder and pour into one beaker.
2. Rinse the measuring cylinder.
3. Measure approximately 5 cm^3 of lead nitrate in the measuring cylinder and pour into another beaker.
4. Zero the balance then place both beakers on the balance at the same time. Accurately measure their total mass.
5. Take them off the balance.
6. Carefully pour the contents of one beaker into the other making sure there is none spilt.
7. Zero the balance again, place both beakers back on the pan and measure the mass.

Safety

Wear eye protection. Solutions of lead compounds may be toxic – wash your hands thoroughly at the end of the lesson.

Questions

1. Has a chemical reaction occurred?
2. Complete the word equation:
potassium iodide + lead nitrate \rightarrow _____ + _____
3. Comment on your result.