

Name \_\_\_\_\_

Date \_\_\_\_\_

# Worksheet 5.2: Practical on an experiment to determine the $A_r$ of lithium

(TR material subchapter 5.3, main teaching ideas, activity 3)

## Analysis of results

- 1 Record your observations from the experiment, including those which could be evaluated as sources of errors.
- 2 Record raw quantitative data in a table. You need to include their units and absolute uncertainties where appropriate.
- 3 Process your raw data, show calculations clearly including all steps and determine the  $A_r$  of lithium.
- 4 Calculate the percentage uncertainties in the pressure, temperature and volume of hydrogen gas. Together with the percentage uncertainty in the mass of lithium, propagate to work out the percentage uncertainty and absolute uncertainty in the  $A_r$  of lithium.

## Evaluation of experiment

- 5 The relative atomic mass of lithium can be found in your IB data booklet. Calculate the percentage error in the  $A_r$  of lithium you obtain in question 4.
- 6 When you add lithium to water, some hydrogen gas produced escapes before the bung is put onto the conical flask. Comment on how this affects the  $A_r$  of lithium calculated. Can you suggest a modification to minimise the gas lost at this stage?
- 7 The lithium pieces stored in oil are usually black on the surface. Explain why this happens and comment how this error affects the  $A_r$  of lithium calculated.
- 8 Based on your calculations in question 4, identify the most significant random error in your experiment and suggest how this could be reduced.