

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use Step 1



General Certificate of Education  
June 2009  
Advanced Subsidiary Examination

# Chemistry

# CHM3X/PM2

Unit 3X Externally Marked Practical Assignment

## Task Sheet 2

To be completed before the EMPA written test.

For submission by 15 May 2009

**You must have**

- a ruler

You may use a calculator.

## The identification of a magnesium carbonate mineral

Magnesium carbonate,  $\text{MgCO}_3$ , can occur as the anhydrous compound, or as hydrates with 2, 3 or 5 molecules of water of crystallisation. In this practical assessment you will identify the type of magnesium carbonate which is present in a mineral obtained in North Yorkshire. Magnesium carbonate is almost insoluble in water but it does react with hydrochloric acid, forming a solution that contains magnesium ions.

In Task 2 you will be provided with a solution which has been obtained by adding an excess of hydrochloric acid to a sample of the mineral. You will titrate the unreacted hydrochloric acid in the mixture with the  $0.100 \text{ mol dm}^{-3}$  solution of sodium hydroxide provided. The titration results will allow you to determine the  $M_r$  of the type of magnesium carbonate in the mineral.

### Task 2 Acid-base titration

#### Determination of the $M_r$ of the type of magnesium carbonate in the mineral

**Wear suitable eye protection at all times.**

**Assume that all solutions are toxic and corrosive.**

- 1 Rinse a burette with the sodium hydroxide solution provided for Task 2. Set up the burette and, using a funnel, fill it with this sodium hydroxide solution. Construct a table of your own design for the titration on the Candidate Results Sheet. Record your initial burette reading.
- 2 You are provided with a mineral solution for Task 2. Using a pipette filler, rinse a pipette with this mineral solution. Use this pipette to transfer  $25.0 \text{ cm}^3$  of the mineral solution to a  $250 \text{ cm}^3$  conical flask.
- 3 Add 3 or 4 drops of phenol red indicator to the conical flask.
- 4 Add the sodium hydroxide solution from the burette until the mixture in the conical flask just turns pink. Record your final burette reading in your table. The colour may fade on standing, but you should record your first end-point and not add more sodium hydroxide.
- 5 Rinse the conical flask with water and repeat the titration until you obtain **two** titres which are within  $0.10 \text{ cm}^3$  of each other. (You should do no more than five titrations.)
- 6 Indicate which of your titres are concordant.

**Candidate Results Sheet    Task 2****Results**

Record your results from the titration in a table of your own design in the space below.

**END OF TASK 2**

**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**