Calibration of a calorimeter – video worksheet

1. 1. The calibration factor of a solution calorimeter containing 100 mL of water was calculated at 0.0231 kJ/°C. A mass of 6.604 grams of magnesium ribbon was placed in the calorimeter with 100 mL of 6.00 M HCl and allowed to react completely. A gas was given off and no precipitate was formed. The temperature was recorded and graphed on the set of axes shown below in fig 1.

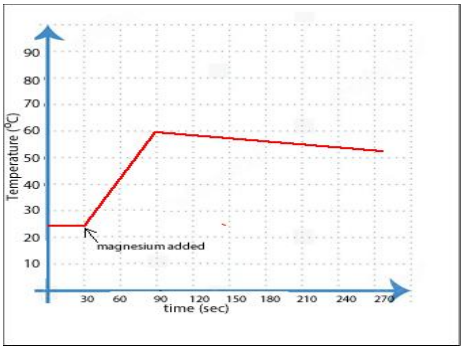

Figure 1

a. Write a balanced chemical equation, states included, for the reaction.

b. Calculate the amount of heat energy, in kJ, released.

c. Calculate the ΔH, in kJ/mol, for the reaction given in a. above.

d. The experiment was repeated with the same apparatus except this time 50 mL of 12.0 M HCl was used. How would the ΔH for the reaction calculated with this new volume of 50 mL of 12.0 M HCl change from that calculated in c. above? Explain

e. On another occasion the same group performing the same experiment obtained the graph shown below. Offer an explanation as to how this graph come about.