

## Heat of precipitation

Answer the following questions

What is the meaning of heat of precipitation?

Heat \_\_\_\_\_ when \_\_\_\_\_ of \_\_\_\_\_ formed

### Question 1

In an experiment to find the heat of precipitation of magnesium carbonate, 25 cm<sup>3</sup> of magnesium nitrate 2.0 moldm<sup>-3</sup> is added into 25 cm<sup>3</sup> of sodium carbonate solution, 2.0 moldm<sup>3</sup> in a container. The temperature of the solution decreases by 6°C. What is the heat of precipitation of magnesium carbonate? [Specific heat capacity of the solution = 4.2 Jg<sup>-1</sup>°C<sup>-1</sup>; density of the solution = 1 g/cm<sup>3</sup>]

a) What is the mass of the solution?

g

b) What is the difference of temperature in the reaction?

°C

c) Calculate the heat change for this reaction

$$Q = ( \quad ) ( \quad ) ( \quad ) = \quad \text{J} = \quad \text{kJ}$$

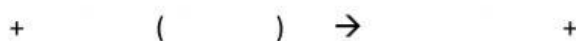
d) What is the number of mole of the solution?

$$\quad \times \quad = \quad \text{mol}$$

e) Calculate the heat of precipitation of magnesium carbonate

$$\Delta H = \quad = \quad \text{kJmol}^{-1}$$

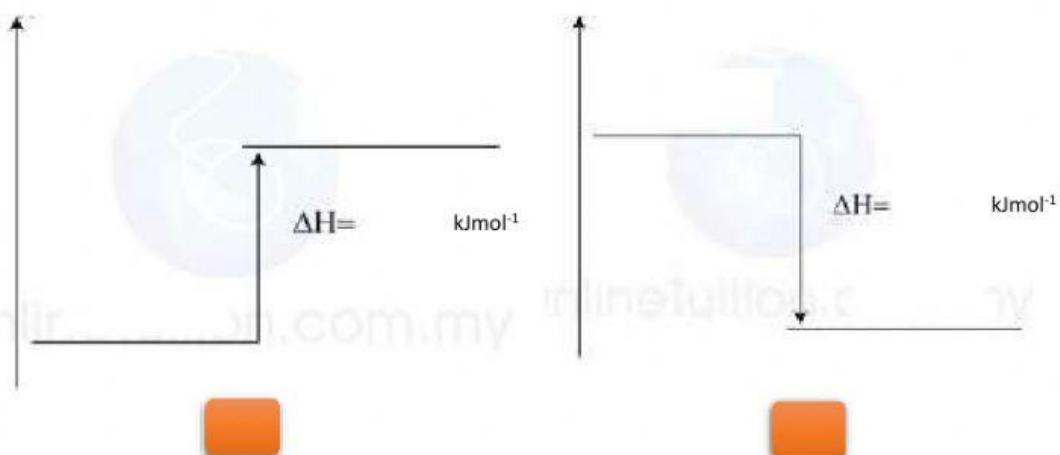
f) Write the chemical reaction for this experiment



g) Write the ionic equation for the experiment



h) Choose the right energy level diagram. Complete the energy level diagram.  
(write 0 for the blank box that not chosen)



## Question 2

An experiment is carried out to determine the heat of precipitation of barium sulphate. In this reaction,  $25\text{cm}^3$  of  $1.0\text{mol dm}^{-3}$  barium chloride, is poured into a polystyrene cup and the initial temperature of solution is recorded.  $25\text{cm}^3$  of  $1.0\text{mol dm}^{-3}$  of sodium sulphate solution is poured into the same polystyrene cup. The resulting solution mixture is stirred and the highest temperature is recorded. The recorded temperatures are shown below.

Initial temperature =  $29^\circ\text{C}$

Highest temperature reached by the solution =  $34^\circ\text{C}$

Calculate the heat of precipitation of barium sulfate and draw an energy level diagram for the reaction in this experiment

a) What is the mass of the solution?

g

b) What is the difference of temperature in the reaction?

$^\circ\text{C}$

c) Calculate the heat change for this reaction

$$Q = ( \quad ) ( \quad ) ( \quad ) = \quad \text{J} = \quad \text{kJ}$$

d) What is the number of mole of the solution?

$$\underline{\quad \quad \quad} \times \underline{\quad \quad \quad} = \quad \quad \quad \text{mol}$$

e) Calculate the heat of precipitation of magnesium carbonate

$$\Delta H = \underline{\quad \quad \quad} = \quad \quad \quad \text{kJmol}^{-1}$$

f) Write the chemical reaction for this experiment



g) Write the ionic equation for the experiment

+

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h) Choose the right energy level diagram. Complete the energy level diagram.  
(write 0 for the blank box that not chosen)

