Edexcel Physics IAL

CP13 - Determining the Specific Latent Heat of a Phase Change

Practical Flashcards

Define specific latent heat.

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The specific latent heat of a substance is the amount of energy required to change the state of 1kg of the substance, without changing its temperature.

What equation is used to determine the energy required to change the state of a substance?

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$$Q = mL$$

Where ‘Q’ is the energy required, ‘m’ is the mass of the substance and ‘L’ is the specific latent heat

Define specific heat capacity.

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The specific heat capacity of a substance is the amount of energy required to increase the temperature of 1kg of a substance by 1 degree, without changing its state.

What equation is used to calculate the energy required to increase the temperature of a substance?

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$$Q = mc\Delta T$$

Where ‘Q’ is the energy required, ‘m’ is the mass of the substance,’c’ is the specific heat capacity and ‘ΔT’ is the change in temperature

At what moment will the ice-water mixture reach its lowest temperature?

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The ice-water mixture will be at its lowest temperature the moment that the last of the ice melts.

How can you measure the initial mass of water in the beaker?

How can you measure the initial mass of water in the beaker?

Measure the mass of the empty beaker using a mass balance. Add the water and then measure the mass of the water and beaker combined. Subtract the mass of the beaker from the combined mass to obtain the mass of the water.

What is the heat balance equation for this experiment?

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Heat lost from cooling water = Heat required for state change + Heat gained by ice

How will heat entering the system from the surroundings affect the value of L?

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Heat entering the system will result in your experimental value for L being too high.

How can you reduce the effects of heat from the surroundings in your experiment?

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Lagging can be added to the beaker to insulate it and reduce heat addition from the surroundings.

Why must the ice already be melting when added to the water?

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If the ice wasn't already melting, the ice would take in heat to increase its temperature to 0°C before it would begin melting. This heat is not accounted for in our experiment.

Why is it advantageous for the ice to be crushed up?

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Crushed up ice will melt quicker than large lumps. The quicker the ice melts, the shorter the time available for heat to enter from the surroundings. This reduces the error caused by heat gain from the surroundings.

How should you separate the ice on the point of melting, from the already melted ice?

How should you separate the ice on the point of melting, from the already melted ice?

When waiting for the ice to reach 0°C, it should be placed in a funnel that is over a beaker. This will separate the water from the ice on the point of melting.

How does the subtraction of two temperature values affect the uncertainty?

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When values are subtracted, their individual uncertainties are added. This means that subtracting temperature values increases the overall uncertainty.

Why should you avoid adding too much ice when carrying out this experiment?

Why should you avoid adding too much ice when carrying out this experiment?

Adding too much ice will result in it taking longer to melt. This means that more heat will enter from the surroundings, leading to less accurate results.

How can you calculate the percentage difference between your value for L and the accepted value?

How can you calculate the percentage difference between your value for L and the accepted value?

[(Your Value - Accepted Value)/Accepted Value] x 100%

What safety precautions should be taken when carrying out this experiment?

What safety precautions should be taken when carrying out this experiment?

If the ice has just been taken from the freezer, care should be taken when handling it. Spillages should be cleaned up immediately to remove the risk of slipping.