WJEC (Eduqas) Physics A Level

SP1.8b - Measurement of the Specific Heat Capacity of a Solid

Practical Flashcards

What is specific heat capacity?

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A substance's specific heat capacity is the amount of energy required to raise the temperature of 1kg of the substance by 1 degree.

What equation can be used to calculate the energy required to change the temperature of a sample?

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Energy = Mass x Specific Heat Capacity x Temperature Change

$$Q = mc\Delta\theta$$

What is the unit of specific heat capacity?

What is the unit of specific heat capacity?

$Jkg^{-1}K^{-1}$

How can the specific heat capacity of a block be obtained from a graph of energy against temperature change?

How can the specific heat capacity of a block be obtained from a graph of energy against temperature change?

The gradient of the graph will equal the product of mass and the specific heat capacity. This means that the specific heat capacity is given by the gradient divided by the mass of the block.

How can the work done by an immersion heater, in a given period of time, be calculated?

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$$\text{Work Done (J)} = \text{Power (W)} \times \text{Time (s)}$$

$$W = Pt$$

How can the power of an immersion heater be determined?

How can the power of an immersion heater be determined?

Power = Current x Voltage

The immersion heater can be connected in a circuit in series with an ammeter and in parallel with a voltmeter. The readings from theses meters can therefore be multiplied together to ascertain the power.

How is your value for specific heat capacity likely to differ from the true value?

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The experimentally determined specific heat capacity is likely to be higher than the true value, as a result of energy losses in the wiring as well as other heat losses.

How can the heat lost into the surroundings be reduced?

How can the heat lost into the surroundings be reduced?

The metal block could be placed in an insulating cover. This will reduce the heat losses into the surrounding air.

Why should the immersion heater be in contact with the block?

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In this experiment heat will be primarily transferred through conduction. This occurs most efficiently when the heater is in contact with the block.

How can the mass of the metal block be measured?

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A mass balance can be used. This should be zeroed before placing the metal block on, to avoid a zero error.

Why should you continue to measure the temperature of the block after the heater has been switched off?

Why should you continue to measure the temperature after the heater has been switched off?

The temperature is likely to continue increasing for a short period after the heater is switched off.

When should you stop measuring the temperature of the block?

When should you stop measuring the temperature of the block?

You should continue measuring the temperature until it starts to decrease. This ensures that you record the maximum temperature that the block reaches.

As well as reducing energy losses, what is another advantage of placing the metal block into an insulating cover?

As well as reducing energy losses, what is another advantage of placing the metal block into an insulating cover?

The insulating cover also acts as a safety precaution. The block will get very hot, so insulating it reduces the likelihood of burning yourself via contact.

What safety precautions should be taken when using an immersion heater?

What safety precautions should be taken when using an immersion heater?

The heater will get very hot and so you must not touch any exposed parts of it during, or immediately after use. It should be switched off when not in use to prevent it overheating.

How can the percentage difference between your value and the true value be calculated?

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[Your Value - True Value]/True Value x 100%