



THERMOCHEMISTRY

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CALORIMETRY

Example 6: Finding mass

An unknown mass of water is initially at 23.0°C and absorbs $1.95 \times 10^3\text{ J}$ of heat. If the final temperature is 32.4°C , what is the mass of the water?

Given: $T_1 = 23.0^{\circ}\text{C}$ $q = 1.95 \times 10^3\text{ J}$ Find: mass
 $T_2 = 32.4^{\circ}\text{C}$ $C_s = 4.184\text{ J/g}^{\circ}\text{C}$

Formula: $q = mC_s\Delta T$

Step 1: Find ΔT

$$\Delta T = 32.4^{\circ}\text{C} - 23.0^{\circ}\text{C} = 9.40^{\circ}\text{C}$$

Step 2: Plug into formula

$$q = mC_s\Delta T$$

$$1.95 \times 10^3\text{ J} = m (4.184\text{ J/g}^{\circ}\text{C}) (9.40^{\circ}\text{C})$$

$$\frac{1.95 \times 10^3\text{ J}}{39.3\text{ J/g}} = \frac{m (39.3\text{ J/g})}{39.3\text{ J/g}}$$

Answer: $m = 49.6\text{ g}$

Note:

You are expected to know the specific heat capacity of water

$$C_s = 4.184\text{ J/g}^{\circ}\text{C}$$

Multiply the right side

Divide both sides by 39.3

Round up to 3 sig figs since given values are 3 sig figs