

#84735 Chemistry, Other

If 1.45 L of water has an initial temperature of 25.0 C, what is its final temperature be after absorption of 9.4×10^{-2} kWh of heat?

Answer:

$$C_p (\text{H}_2\text{O}) = 4.184 \text{ J/g C}$$

$$9.4 \times 10^{-2} \text{ kWh} = 9.4 \times 10^{-2} \text{ kWh} \left(\frac{3600 \text{ s}}{1 \text{ hr}} \right) \left(\frac{1000 \text{ J}}{1 \text{ kJ}} \right) = 338400 \text{ J}$$

$$H = m \times C_p \times \Delta T$$

where H is the heat;

m is the mass;

C_p is the heat capacity;

ΔT is the change in temperature.

$$338400 \text{ J} = (1.45 \text{ L}) \times (1000 \text{ g/L}) \times (4.184 \text{ J/g C}) \times \Delta T$$

$$\Delta T = 55.78 \text{ C}$$

Therefore, the new temperature is $T = 55.78 \text{ C} + 25 \text{ C} = 80.78 \text{ C}$.

Answer provided by www.AssignmentExpert.com