

Problema 1115: En un calorímetro tenemos 250g de agua a 18°C y añadimos 350g de agua a 50°C. Si la temperatura de equilibrio es de 35°C, calcula la capacidad calorífica del calorímetro. Dato  $c(\text{agua}) = 4180 \text{ J} \cdot \text{kg}^{-1} \cdot \text{K}^{-1}$

|                          |                          |
|--------------------------|--------------------------|
| $m_1 = 250 \text{ g}$    | $m_2 = 350 \text{ g}$    |
| $\text{H}_2\text{O}$     | $\text{H}_2\text{O}$     |
| $T_1 = 18^\circ\text{C}$ | $T_2 = 50^\circ\text{C}$ |

$$T_{\text{eq}} = 35^\circ\text{C}$$

$$Q_{\text{cedido}} + Q_{\text{absorbido}} = 0$$

$$Q_{\text{ced agua caliente}} + Q_{\text{abs agua fría}} + Q_{\text{abs calorímetro}} = 0$$

$$m_2 \cdot c_{\text{H}_2\text{O}} \cdot (T_{\text{eq}} - T_2) + m_1 \cdot c_{\text{H}_2\text{O}} \cdot (T_{\text{eq}} - T_1) + C_{\text{cal}} \cdot (T_{\text{eq}} - T_1) = 0$$

$$C_{\text{cal}} = \frac{-m_2 \cdot c_{\text{H}_2\text{O}} \cdot (T_{\text{eq}} - T_2) - m_1 \cdot c_{\text{H}_2\text{O}} \cdot (T_{\text{eq}} - T_1)}{(T_{\text{eq}} - T_1)}$$

$$C_{\text{cal}} = \frac{-0,350 \text{ kg} \cdot 4180 \frac{\text{J}}{\text{kg}^\circ\text{C}} \cdot (35^\circ\text{C} - 50^\circ\text{C}) - 0,250 \text{ kg} \cdot 4180 \frac{\text{J}}{\text{kg}^\circ\text{C}} \cdot (35^\circ\text{C} - 18^\circ\text{C})}{(35^\circ\text{C} - 18^\circ\text{C})} = 246 \frac{\text{J}}{\text{K}}$$