

## Thermochemistry: Calorimetry 1

- 1) Calculate the heat capacity of an aluminium block that must absorb  $629\text{ J}$  of heat from its surroundings in order for its temp. to rise from  $22$  to  $145^\circ\text{C}$ .

Ans  $q = C \Delta T$        $C = \frac{q}{\Delta T}$        $q = 629\text{ J}$   
 $\Delta T = (145 - 22)^\circ\text{C} = 123^\circ\text{C}$

$$C = \frac{q}{\Delta T} = \frac{629\text{ J}}{123^\circ\text{C}} = 5.11\text{ J}/^\circ\text{C}$$

- 2) How much heat in kJ, does it take to raise the temp of  $225\text{ g}$  of water from  $25.0^\circ\text{C}$  to  $100.0^\circ\text{C}$ ?

$$q = m s \Delta T$$

$m = 225\text{ g}$   
 $s = 4.18\text{ J/g}^\circ\text{C}$   
 $\Delta T = 100 - 25 = 75^\circ\text{C}$

$$q = 225\text{ g} \times 4.18\text{ J/g}^\circ\text{C} \times 75^\circ\text{C} = 7.05 \times 10^4\text{ J} = \boxed{70.5\text{ kJ}}$$

- 3) What will be the final temp. of a  $5.00\text{ g}$  silver ring at  $37.0^\circ\text{C}$  gives off  $25.0\text{ J}$  of heat to its surroundings. (Sp heat Ag =  $0.235\text{ J/g}^\circ\text{C}$ )

$$q = m s \Delta T$$
$$\Delta T = \frac{q}{ms}$$
$$= \frac{25.0\text{ J}}{5.00\text{ g} \times 0.235\text{ J/g}^\circ\text{C}}$$

$$\Delta T = \boxed{-21.3^\circ\text{C}}$$

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$$-21.3^\circ\text{C} = T_f - 37.0^\circ\text{C}$$

$$-21.3^\circ\text{C} + 37.0^\circ\text{C} = T_f$$
$$\boxed{15.7^\circ\text{C } T_f}$$