

Thermochemistry - Calorimetry - 2.

- 1) * A 15.5g sample of a metal alloy is heated to 98.9°C and then dropped into 25.0g of water in a calorimeter. The temp. of water rises from 22.5°C to 25.7°C. Calculate the sp. heat of the alloy.

Ans two energy changes one \rightarrow alloy to ~~water~~ water.
 \rightarrow alloy temp. change.

$$\begin{aligned} q_{\text{H}_2\text{O}} &= m s \Delta T \\ &= 25.0\text{g} \times \frac{4.18\text{J}}{\text{g}^\circ\text{C}} \times (25.7 - 22.5)^\circ\text{C} \\ &= 334\text{J} \quad (\text{to raise the water temp.}) \end{aligned}$$

\rightarrow heat released by alloy = -334J. (exo). endo.

$$q_{\text{alloy}} = m s \Delta T \quad (\text{alloy})$$

$$\begin{aligned} s &= \frac{q_{\text{alloy}}}{m \Delta T} = \frac{-334\text{J}}{15.5\text{g} \times (25.7 - 98.9)^\circ\text{C}} \\ &= \boxed{0.29\text{J/g}^\circ\text{C}} \quad \text{alloy.} \end{aligned}$$