

Answer on Question #68971 – Chemistry | General Chemistry

1. In the laboratory a student finds that it takes 118 Joules to increase the temperature of 11.7 grams of solid graphite from 21.1 to 36.3 degrees Celsius.
The specific heat of graphite calculated from her data is ___ J/g°C.

Solution:

$$C = \frac{Q}{m \cdot T}, \quad C = J/g \cdot ^\circ\text{C}$$

$$T = T_2 - T_1 = 36.3 - 21.1 = 15.2^\circ\text{C}$$

$$C = \frac{118}{11.7 \cdot 15.2} = 0.6635 \text{ (J/g} \cdot ^\circ\text{C)}.$$

Answer: **0.6635** (J/g · °C).

2. In the laboratory a student finds that it takes 105 Joules to increase the temperature of 13.5 grams of solid sulfur from 24.1 to 35.4 degrees Celsius.
The specific heat of sulfur calculated from her data is ___ J/g°C

Solution:

$$C = \frac{Q}{m \cdot T}, \quad C = J/g \cdot ^\circ\text{C}$$

$$T = T_2 - T_1 = 35.4 - 24.1 = 11.3^\circ\text{C}$$

$$C = \frac{105}{13.5 \cdot 11.3} = 0.6993 \text{ (J/g} \cdot ^\circ\text{C)}.$$

Answer: **0.6883** (J/g · °C).

3. What is the energy change when the temperature of 11.3 grams of solid graphite is decreased from 36.1 °C to 22.7 °C ?
_____ joules

Solution:

$$C = \frac{Q}{m \cdot T}, \quad \text{where } Q = C \cdot m \cdot T, \quad T = T_2 - T_1 = 36.1 - 22.7 = 13.4^\circ\text{C}$$

$$Q = 0.6635 \cdot 13.4 \cdot 11.3 = 100.5 \text{ (J)}.$$

Answer: **100.5** (J).

4. How much energy is required to raise the temperature of 10.4 grams of solid sulfur from 23.6 °C to 39.1 °C ?

_____ joules

Solution:

$$C = \frac{Q}{m \cdot T}, \quad \text{where } Q = C \cdot m \cdot T, \quad T = T_2 - T_1 = 39.1 - 23.6 = 15.5^\circ\text{C}$$

$$Q = 0.6883 \cdot 10.4 \cdot 15.5 = 111 \text{ (J)}.$$

Answer: **111 (J)**.