

## Answer on Question #78231, Chemistry / General Chemistry

### Question:

A sample of copper has a mass of 100.0 g with a specific heat of 0.385 J/g°C. The sample is initially at 10.0 °C and heated up to 100.0 °C.

- How much energy did the copper sample absorb?
- If a 100.0 g sample of aluminum also at 10.0 °C absorbs the same amount of energy as the copper sample in (a), what will the final temperature of the aluminum be? (specific heat of Al is 0.903 J/g°C).
- What can you say about the specific heat of a substance and the amount of energy the substance can absorb before the temperature increases based on what you did in parts (a) and (b)?

### Solution:

a.

$$\text{Energy absorbed: } Q = c \cdot m \cdot \Delta T = 0.385 \cdot 100.0 \cdot (100.0 - 10.0) = 3465 \text{ J}$$

b.

$$\text{From the formula above: } \Delta T = Q / (c \cdot m) = 3465 / (0.903 \cdot 100.0) = 38.4 \text{ }^\circ\text{C}$$

$$\text{The final temperature: } 10.0 + 38.4 = 48.4 \text{ }^\circ\text{C}$$

### Answer:

a. 3465 J

b. 48.4 °C

c. Specific heat is the energy needed to raise the temperature of one gram of material by 1 °C. So, the higher specific heat - the more energy needed for heating (or the rising of temperature will be lower). Other words, specific heat is the measure how much energy material can absorb.