Answer on Question #67979, Chemistry / General Chemistry - completed

Calculate the magnitude of the heat energy (Joules) gained by a 360 g sample of ethanol that goes from a temperature of 30.1 degrees celsius to 75.5 degrees celsius.

Solution:

$$Q = m{\times}c{\times}\Delta T$$
$$Q = 360{\times}2.39{\times}(75.5 - 30.1) = 39062.1\ (J) = 39.06\ (kJ)$$

Answer: 39.06 kJ.

2. Calculate the initial temperature (degrees C) of a 2.50 g sample of aluminum that has a final temperature of 33.3 degrees celsius and lost -25.9 J or heat energy.

$$Q = m{\times}c{\times}\Delta T \Rightarrow T_1 = T_2 - \frac{Q}{m{\times}c}$$
$$T_1 = 33.3 - \frac{25.9}{2.50{\times}0.92} = 22.0\ ^\circ\text{C}$$

Answer: 22.0°C.

3. Calculate the specific heat capacity (J/g*degrees Celsius) of iron, if a 33.4 g sample gained 52.5 J of heat energy in going from an initial temperature of 6.10 degrees C to a final temperature of 9.60 degrees C.

Solution:

$$Q = m{\times}c{\times}\Delta T \Rightarrow c = \frac{Q}{m{\times}\Delta T}$$
$$c = \frac{52.5}{33.4{\times}(9.60 - 6.10)} = 0.449\ (J/g * {}^\circ\text{C})$$

Answer: 0.449 J/g*°C.

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