

Answer on Question #58071, Chemistry / General Chemistry

If a 100 kg sample of aluminum at 25.0 degree Celsius is heated with 500 kJ of heat energy, what will be the final temperature of the metal sample? The specific heat of aluminum is 0.897J/g*C

Solution:

The specific heat is equal

$$C = \frac{Q}{m(T_2 - T_1)}$$

where Q - amount of heat;

m - mass of aluminum;

T₁ and T₂ - initial and final temperatures.

Resolve this equation relative to T₂. Get

$$T_2 = T_1 + \frac{Q}{m \cdot C}$$

Let us substitute in this equation the data from the conditions of the problem

$$T_2 = 25 + \frac{500 \cdot 10^3}{100 \cdot 10^3 \cdot 0.897} = 25 + 5.6 = 30.6 \text{ } ^\circ\text{C}$$

Answer: The final temperature of the aluminum sample is equal 30.6 °C