Answer on question #54862 - Chemistry - General chemistry

Question:

A 20.0 gram aluminum ball (specific heat 0.90 J g-1 °C-1) at 80 °C was placed in 50 grams of water initially at 22.9 °C. What is the final temperature of the water and aluminum assuming no heat was lost during the energy exchange.

Solution:

The energy amount going out of the warm water is equal to the energy amount going into the cool water. This means:

$q_{lost} = q_{gain}$

$q = m \times C \times \Delta T$

by substitution:

$m_1 \times C_1(T_1-x) = m_2 \times C_2(x-T_2)$

$20 \times 0,9 \times (80-x) = 50 \times 1(x-22.9)$

$1440-18x = 50x-1145$

$68x = 2585$

$x = 38.01$

Answer: the final temperature of water and aluminum is 38.01 C°