Answer on Question #63400 - Chemistry - General Chemistry

Question: An iron kettle weighing 2.38 kg contains 2.80 kg of water at 21.9°C. The kettle and water are heated to 86.2°C. How many joules of energy are absorbed by the water and by the kettle?

Solution

To solve this problem, we need to take the values of the heat capacities for iron and water from the tables: c(Fe) = 444 J/kg*°C, c(H_2O) = 4184 J/kg*°C.

1) Find the amount of energy absorbed by the kettle:

$$Q(Fe) = m(Fe) * c(Fe) * \Delta t = 2.38 * 444 * (86.2 - 21.9) = 67947.096\,J = 6794.7096 * 10\,J$$

2) Find the amount of energy absorbed by the water:

$$Q(H_2O) = m(H_2O) * c(H_2O) * \Delta t = 2.80 * 4184 * (86.2 - 21.9) = 753287.36\,J$$
$$= 75328.736 * 10\,J$$

Answer: the energy absorbed by the water is 75328.736*10 J, the energy absorbed by the kettle is 6794.7096*10 J.