W-6C General Chemistry Week 30 5/1

The specific heat capacity of zinc is 0.386 J/g °C. How many joules would be released when 454 grams of zinc at 96.0 °C were cooled to 28.0 °C?

$q = mc\Delta T$

$(454\,g)(0.386\,J/g\,°C)(28-96)\,°C$

$-11916.5\ J$

$-11.9\ kJ$

Would that amount of energy boil 216 g of water at 30 °C? $c = 4.184\ J/g\,°C$

$q = mc\Delta T$

$\Delta T = \frac{q}{mc} = \frac{-11916.5\ J}{(216\,g)(4.184\,J/g\,°C)}$

$-13.2\ °C$

$30\,°C \uparrow 13.2$

$43.2\ °C$

0.1277 g Mg ribbon was added to 200.0 mL of 0.500 M HCl at 24.12 °C.

The water temperature increased to 27.10 °C.

Calculate ΔH per mol of HCl.

$$0.500\ M = \frac{0.5\ mol}{1\ L}$$

$$200\ mL = 0.2\ L$$

$$0.2\ \cancel{L} * \frac{0.5\ mol}{1\ \cancel{L}} = 0.1\ mol$$

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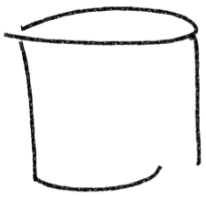
0.8 M NaCl

250 mL = 0.250 L



250 mL

$$0.250\ \cancel{L} * \frac{0.8\ \cancel{mol}}{1\ \cancel{L}} * \frac{58.4\ g}{1\ \cancel{mol}} = 11.68\ g\ NaCl$$

Molar mass

$NaCl \rightarrow 22.9 + 35.5 = 58.4\ \frac{g}{mol}$

from previous page... 0.1 mol HCl

24.12°C → 27.10°C ≈ 200 mL sol.

[water] (q) = mcΔT

1 mL water → g water

(200 g)(4.184)(27.1 - 24.12)

2493.66 J

ΔH: J/mol

$$\frac{2493.66\ J}{0.1} = 24937\ J$$

24.9 kJ/mol