$\Delta H = q$

Molar enthalpy = $\Delta H / n$

n = # of moles of reactants (convert measured mass to mole by dividing by molar mass if necessary)

In **molar enthalpy of neutralization** n = CV

C = concentration in M(molarity = moles/L)

V= volume in liters

Example:

9.0 g of charcoal (C) is consumed in a calorimeter. IF we assume the 2.0 L of water absorbed the heat the temperature of the water went from 20.25 to 56.04 ◦C. What is the molar enthalpy of carbon?

m= 2000 ml = 2000 g

C = 4.18 J/g◦C

ΔT = 56.04-20.25 = 35.79

q= m C ΔT

= 2000 g x 4.18 J/g◦C x 35.79

ΔH = -q= -299920 J ~-299.92 KJ

n= 9.0g / 12.0 g/mol= 0.7493 mole

Molar enthalpy = ΔH / n = -299.92 Kj/0.7493 mole = -400.27 KJ/ mole

-4.0×10^2 KJ/ mole

Sep 24-8:53 AM

300. mL of 0.200 M aqueous KOH neutralizes 150. mL of aqueous 0.200 M H_2SO_4. We go from an average initial temperature of 22.3 °C to a maximum of 29.2 C. Calculate the molar heat(enthalpy) of neutralization of KOH.

$2KOH + H_2SO_4 \longrightarrow K_2SO_4 + 2\ H_2O$

Knowns:

m= 300 mL + 150 mL = 450ml = 450 g

C = 4.18 J/g°C

ΔT = 29.2-22.3 = 6.9

q= m C ΔT

= 450 g x 4.18 J/g°C x 6.9 °C

= -12978.9 J - 12.979 KJ

n = CV 0.2 M x 0.300L or 0.2 M KOH = $\frac{\text{x moles}}{\text{0.300 L KOH}}$

= 0.06 mole KOH

Molar enthalpy = ΔH / n

= -12.979 KJ / 0.06 mol

= -217 KJ / mole KOH

Sep 24-8:55 AM

300. mL of 0.200 M aqueous KOH neutralizes 150. mL of aqueous 0.200 M H_2SO_4. We go from an average initial temperature of 22.3 °C to a maximum of 29.2 C. Calculate the molar heat(enthalpy) of neutralization of KOH.

$2KOH + H_2SO_4 \longrightarrow K_2SO_4 + 2\ H_2O$

Knowns:

m= 300 mL + 150 mL = 450ml = 450 g

C = 4.18 J/g◦C

ΔT = 29.2-22.3 = 6.9

q= m C ΔT

= 450 g x 4.18 J/g◦C x 6.9 ◦C

=-12978.9 J - 12.979 KJ

n = cv = 0.200M x .0150 L

= 0.0300 moles

Molar enthalpy = ΔH / n

$$\frac{-12.979\ \text{kJ}}{0.0300\ \text{moles}}$$

=-433 kJ/mol

Sep 20-8:40 AM