Question #49219, Chemistry, Physical Chemistry

How can I calculate the amount of moles of water that is formed given a theoretical value of -55.90 kJ/mol H_2O that is formed and from using the amount of joules of heat that is liberated

Answer:

In order to calculate the heat of neutralization, which is equal to 55.9 kJ/mol, you need to spend a special experiment.

1. It should get the calorimeter and measure the constant of the calorimeter (k)

2. Pour calorimeter certain amount of acid (e.g. HCl 0.1M 110 ml)

3. Measure the initial temperature of the calorimeter with acid T1

4. Then pour into the calorimeter alkaline solution (e.g. 0.1M NaOH 100 ml)

5. Measure the temperature in the calorimeter after mixing T2

6. $q_{rxn} = (m_{HCl(sol)} \cdot c + k) \cdot \Delta t$

$\Delta t = T2 - T1$

7. $\Delta H_n = (-q_{rxn})/(V_{NaOH} \cdot C_{NaOH}) = -55.9$ kJ/mol

(Take into account the density of the solutions at these concentrations like the density of water)