Answer on Question #43214 - Chemistry - Other

Question:

I'm supposed to write a balanced equation for every neutralization, but I have no idea how. One of the questions is: 20.0 mL of 0.100 M NaOH is added to 40.0 mL of HCl of unknown concentration.

Please help fast! D:

Answer:

Neutralization is a chemical reaction in which an acid and a base react to form a salt and water (in common case). The word "neutralization" is used because the acid and base properties of H^+ and OH^- are destroyed or neutralized. In the reaction, H+ and OH- combine to form HOH or H_2O or water molecules. Neutralization is a type of double replacement reaction.

For this case, the balanced equation for neutralization reaction between NaOH and HCl is:

$$NaOH + HCl = NaCl + H_2O$$

So, to write neutralization reaction you need to write a reactants before "=" and products after this sign – water and salt. To write a right formula of salt, you need to take an ion of metal in given base and combine it with acidic residue in given acid (see reaction above) and don't forget about valence of these ions.

To find out unknown concentration of HCl, we should calculate number of moles of NaOH reacted:

$$n(NaOH) = C(NaOH)*V(NaOH\ solution) = 0.100 * 0.020L = 0.002\ mol$$

The balanced equation shows 1 mole of NaOH reacts with 1 mole of HCl, so the moles of HCl reacted is equal to the moles of NaOH reacted:

$$n(HCl) = n(NaOH) = 0.002\ mol$$

Concentration of HCl is:

$$C(HCl) = n(HCl) / V(HCl) = 0.002 / 0.040L = 0.05\ mol/L = 0.05\ M$$

Answer: 0.05 M