Neutralization Reactions

Recall - $Ca(OH)_{2(s)} + 2HCl_{(aq)} \rightarrow 2H_2O_{(l)} + CaCl_{2(aq)}$

$Ca(OH)_2$: Ksp lab. dihydroxide; base

HCl: acid

H_2O: water

$CaCl_2$: salt, ionic

"neutral"

Used for titration - find an unknown conc. using a reactant of known concentration.

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Example - A 14.8 mL sample of HCl is titrated with 8.5 mL of 0.50 mol/L NaOH. Find [HCl].

$HCl + NaOH \rightarrow H_2O + NaCl$

i) Moles $NaOH = \frac{0.50\ mol}{L} \times 0.0085\ L$

ii) mol HCl

$= 0.00425$ mol $NaOH$

$0.00425\ mol\ NaOH \times \frac{1\ mol\ HCl}{1\ mol\ NaOH} = 0.00425\ mol\ HCl$

iii) $[HCl]_{mol/L} = \frac{0.00425\ mol}{0.0148\ L} = 0.29\ mol/L$

Example 2 - $[H_2SO_4] = 0.250\ mol/L$

KOH - 37.2 mL at 0.650 mol/L

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

i) moles KOH $\frac{0.650\ mol}{L} \times 0.0372\ L = 0.0242$ mol KOH

ii) $0.0242\ mol\ KOH \times \frac{1\ mol\ H_2SO_4}{2\ mol\ KOH} = 0.0121\ mol\ H_2SO_4$

iii) Vol H_2SO_4 - $\frac{1\ L\ H_2SO_4}{0.250\ mol} \times 0.0121\ mol\ H_2SO_4 = 0.0484$ L or

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