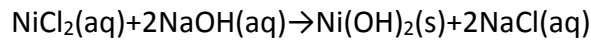


## Answer on Question #69336, Chemistry, General Chemistry

Answer the following for the reaction:



- 1) How many grams of  $\text{Ni}(\text{OH})_2$  are produced from the reaction of 35.0 mL of 1.75 M NaOH?
- 2) How many milliliters of 0.200M NaOH solution are needed to react with 34.0 mL of a 0.430 M  $\text{NiCl}_2$  solution?
- 3) What is the molarity of 30.0 mL of a  $\text{NiCl}_2$  solution that reacts completely with 17.0 mL of a 0.250 M NaOH solution?

### Solution:

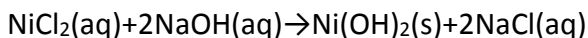
- 1) According to given chemical reaction, we can calculate mass of  $\text{Ni}(\text{OH})_2$ . The mass of sodium hydroxide equals:

$m(\text{NaOH}) = C(\text{NaOH}) \cdot M(\text{NaOH}) \cdot V_{\text{sol}}$ , where C is a molar concentration; M is a molar mass of NaOH;  $V_{\text{sol}}$  – volume of solution.

So:

$$m(\text{NaOH}) = 1.75 \cdot 40 \cdot 0.035 = 2.45 \text{ (g)}$$

$$2.45 \text{ g} \quad X \text{ g}$$



$$2 \cdot 40 = 80 \quad 92.71$$

Make a proportion:

$$X = \frac{2.45 \cdot 92.71}{80} = 2.84 \text{ (g)}$$

So, the mass of  $\text{Ni}(\text{OH})_2$  is 2.84 grams.

- 2) In equivalent point we have interaction:  
 $n(\text{NiCl}_2) = n(\text{NaOH})$ , where n is number of moles.

Or:

$$C(\text{NiCl}_2) \cdot V(\text{NiCl}_2) = C(\text{NaOH}) \cdot V(\text{NaOH}) \quad (1)$$

Using last equation, we can determine the volume of NaOH:

$$V(\text{NaOH}) = \frac{C(\text{NiCl}_2) \cdot V(\text{NiCl}_2)}{C(\text{NaOH})} = \frac{0.430 \cdot 34.0}{0.200} = 73.1 \text{ (mL)}$$

It means, that 73.1 milliliters of 0.200M NaOH solution are needed to react with 34.0 mL of a 0.430 M NiCl<sub>2</sub> solution.

3) Using equation (1), we can calculate the molarity of NiCl<sub>2</sub>:

$$C(\text{NiCl}_2) = \frac{C(\text{NaOH}) \cdot V(\text{NaOH})}{V(\text{NiCl}_2)} = \frac{0.250 \cdot 17.0}{30.0} = 0.142 \text{ (M)}$$

It means, that 30.0 mL of a 0.142 M NiCl<sub>2</sub> solution reacts completely with 17.0 mL of a 0.250 M NaOH solution.

**Answer:** 1) 2.84 g; 2) 73.1 mL; 3) 0.142 M.

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