

Answer on Question#39839 - Chemistry - Other

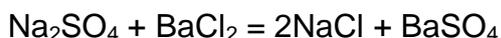
Questions

1) If 56.0 mL of BaCl_2 solution is needed to precipitate all the sulfate ion in a 740 mg sample of Na_2SO_4 , what is the molarity of the solution?

2) If 43.0 mL of 0.210 M HCl solution is needed to neutralize a solution of $\text{Ca}(\text{OH})_2$, how many grams of $\text{Ca}(\text{OH})_2$ must be in the solution?

Answer

1) The total chemical reaction of this process:



The molarity of a solution could be calculated according to the formula:

$$C_M = \frac{v}{V}$$

where v- moles of the solute, moles;

V-volume of the solvent, l.

$$v = \frac{m}{M}$$

where m-mass of the solute, grams;

M-molar mass of the solute, gram/moles.

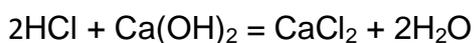
$$M(\text{Na}_2\text{SO}_4) = 142 \text{ g/mol}$$

$$v(\text{Na}_2\text{SO}_4) = \frac{0.74}{142} = 0.0052 \text{ mol}$$

$$v(\text{Na}_2\text{SO}_4) = v(\text{BaCl}_2) = 0.0052 \text{ mol}$$

$$C_M(\text{BaCl}_2) = \frac{0.0052}{0.056} = 0.093 \text{ M}$$

2) The total chemical reaction of this process:



The molarity of a solution could be calculated

according to the formula:

$$C_M = \frac{v}{V}$$

where v - moles of the solute, moles;

V -volume of the solvent, l.

According to this equation, the amount of moles is:

$$v = C_M \cdot V$$

$$v(\text{HCl}) = 0.210 \cdot 0.043 = 0.0090 \text{ mol}$$

$$v(\text{Ca}(\text{OH})_2) = \frac{v(\text{HCl})}{2} = \frac{0.0090}{2} = 0.0045 \text{ mol}$$

$$v = \frac{m}{M} \quad m = v \cdot M$$

where m -mass of the solute, grams;

M -molar mass of the solute, gram/moles.

$$M(\text{Ca}(\text{OH})_2) = 74 \text{ g/mol}$$

$$m(\text{Ca}(\text{OH})_2) = 0.00452 \cdot 74 = 0.33 \text{ g}$$