Answer on Question #43524 - Chemistry - Inorganic Chemistry

Question:

How many grams of solid KCl would be obtained if 100mL of a solution with a 0.5M solution of KCl was evaporated to dryness?

Answer:

$$\text{molarity} = \frac{\text{moles of solute}}{\text{liter of solution}}$$

From this equation we calculate moles of solute of KCl in 100 mL of 0.50 M.

$$\text{moles of solute} = \text{molarity} * \text{liter of solution} = 0.5M * 0.1 \text{ L} = 0.05 \text{ moles}$$

Now we calculate mass of 0.05 moles of KCl which left after evaporation of 100 mL of a solution with a 0.5M of KCl.

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

where ϑ – is number of moles of KCl, m – is mass of KCl, M – is molecular mass of KCl.

$$M(KCl) = 39.0983 + 35.453 = 74.5513 \approx 74.55 \ ^g/_{mole}$$

So mass of KCl is:

$$m = \vartheta \times M = 0.05 \ mole \times 74.55 \ ^g/_{mole} = 3.7275 \ g = 3.73 \ g$$

Answer: mass of **KCl** is 3.73 g