Answer on Question #46599 - Chemistry – Other

Question

If you have 48.00g of K_2CrO_4, what volume of 0.1500 M $BaCl_2$ solution is needed to completely react with all the K_2CrO_4?

Answer:

Balanced reaction equation is:

$$K_2CrO_4(s) + BaCl_2(aq) = BaCrO_4\downarrow(s) + 2KCl(aq)$$

Molar masses of K_2CrO_4 and $BaCl_2$ equal:

$$M(K_2CrO_4) = 2M(K) + M(Cr) + 4M(O) = 2 \cdot 39.098 + 52.996 + 4 \cdot 15.999 = 195.188 \frac{g}{mol}$$

$$M(BaCl_2) = M(Ba) + 2M(Cl) = 137.327 + 2 \cdot 35.45 = 208.227 \frac{g}{mol}$$

Number of moles of K_2CrO_4 equals:

$$n = \frac{m(K_2CrO_4)}{M(K_2CrO_4)} = \frac{48.00}{195.188} = 0.246\ mol$$

According to reaction equation 1 mol of K_2CrO_4 reacts with 1 mol of $BaCl_2$, so 0.246 mol of $BaCl_2$ is needed to completely react with all the K_2CrO_4.

The volume of 0.1500 M $BaCl_2$ solution needed is:

$$V = \frac{n(BaCl_2)}{C} = \frac{0.246}{0.1500} = 1.64\ L$$

Answer: 1.64 L