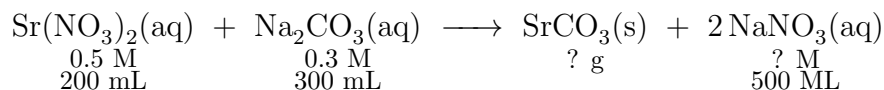


5. Calculate the mass of precipitate and the concentration of sodium nitrate solution the forms when 200 mL of 0.5 M strontium nitrate solution and 300 mL of 0.3 M sodium carbonate solution are mixed together (assume a total volume of 500 mL)



Consider  $\text{Sr(NO}_3)_2$  :

$$\begin{array}{ll} n = ? & n = CV \\ C = 0.5 \text{ mol/L} & n = 0.5 \text{ mol/L} \times 0.200 \text{ L} \\ V = 200 \text{ mL} \rightarrow 0.200 \text{ L} & n = 0.100 \text{ mol Sr(NO}_3)_2 \text{ available} \\ & \text{EXCESS} \end{array}$$

$$0.100 \text{ mol Sr(NO}_3)_2 \times \frac{1 \text{ mol Na}_2\text{CO}_3}{1 \text{ mol Sr(NO}_3)_2} = 0.100 \text{ mol Na}_2\text{CO}_3 \text{ required}$$


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Consider  $\text{Na}_2\text{CO}_3$  :

$$\begin{array}{ll} n = ? & n = CV \\ C = 0.3 \text{ mol/L} & n = 0.3 \text{ mol/L} \times 0.300 \text{ L} \\ V = 300 \text{ mL} \rightarrow 0.300 \text{ L} & n = 0.0900 \text{ mol Na}_2\text{CO}_3 \text{ available} \\ & \text{LIMITING} \end{array}$$

$$0.0900 \text{ mol Na}_2\text{CO}_3 \times \frac{1 \text{ mol Sr(NO}_3)_2}{1 \text{ mol Na}_2\text{CO}_3} = 0.0900 \text{ mol Sr(NO}_3)_2 \text{ required}$$


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therefore the limiting reagent is  $\text{Na}_2\text{CO}_3$

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$$0.0900 \text{ mol Na}_2\text{CO}_3 \times \frac{1 \text{ mol SrCO}_3}{1 \text{ mol Na}_2\text{CO}_3} \times \frac{147.63 \text{ g SrCO}_3}{1 \text{ mol SrCO}_3} = 13.3 \text{ g SrCO}_3$$


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$$0.0900 \text{ mol Na}_2\text{CO}_3 \times \frac{2 \text{ mol NaNO}_3}{1 \text{ mol Na}_2\text{CO}_3} = 0.180 \text{ mol NaNO}_3$$

$$\begin{array}{ll} n = 0.1800 \text{ mol} & C = \frac{n}{V} \\ C = ? & \\ V = 0.200 \text{ L} + 0.300 \text{ L} = 0.500 \text{ L} & C = \frac{0.180 \text{ mol}}{0.500 \text{ L}} \\ & C = 0.360 \text{ M NaNO}_3 \end{array}$$


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