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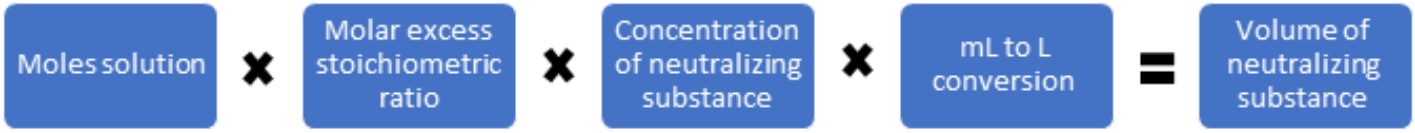
Calculating Molar Excess for Disposal



Example: 100 mL of a 0.1 M solution of potassium dichromate needs to be neutralized by a twofold molar excess of 4% sodium thiosulfate.

First, find the moles of potassium chromate solution:

$$=100\ \text{mL} \times 0.1\ \frac{\text{mol}}{\text{L}} \times \frac{1\ \text{L}}{1000\ \text{mL}} = 0.01\ \text{mol}\ K_2Cr_2O_7$$

Next, find the 4% sodium thiosulfate solution needs to be converted to concentration:

$$\%\text{m/v} = \frac{\text{g of solute}}{\text{mL of solution}}$$

$$4\%\ \text{m/v} = \frac{4.0\ \text{g}}{100\ \text{mL}}$$

$$\text{Concentration of neutralizing substance} = \frac{4.0\ \text{g}}{100\ \text{mL}} \times \frac{1000\ \text{mL}}{1\ \text{L}} \times \frac{\text{mol}}{158.11\ \text{g}} = 0.25\ \text{mol/L}$$

Lastly, use the moles of solution and concentration of neutralization substance to find volume needed for reaction:

$$=0.01\ \text{mol}\ K_2Cr_2O_7 \times \frac{2\ \text{mol excess}\ Na_2S_2O_3}{1\ \text{mol}\ K_2Cr_2O_7} \times \frac{\text{L}}{0.25\ \text{mol}} \times \frac{1000\ \text{mL}}{1\ \text{L}} = 79\ \text{mL}\ Na_2S_2O_3$$

Conclusion: Add 79 mL of sodium thiosulfate to 100 mL of 0.1 M potassium dichromate to neutralize