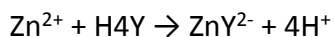
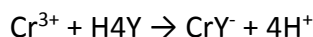


Answer on Question #67354 - Chemistry - General Chemistry

Question: Chromium (III) is slow to react with EDTA (H₄Y) and is therefore determined by back-titration. A pharmaceutical preparation containing chromium (III) is analyzed by treating a 2.63g sample with 5.00 mL of 0.0103 M EDTA. Following reaction, the unreacted EDTA is back titrated with 1.32mL of 0.0112M zinc solution. What is the percentage chromium chloride in the pharmaceutical preparation? (FW chromium chloride= 158.36 g/mol).



Solution

1) Find the total amount of substance of EDTA:

$$n_{\text{total}}(\text{EDTA}) = C(\text{EDTA}) * V(\text{EDTA}) = 0.0103 * 0.005 = 5.15 * 10^{-5} \text{ mol.}$$

2) Find the amount of substance of EDTA consumed in the reaction with zinc:

$$n(\text{EDTA}_{\text{Zn}^{2+}}) = n(\text{Zn}^{2+}) = C(\text{Zn}^{2+}) * V(\text{Zn}^{2+}) = 0.0112 * 0.00132 = 1.4784 * 10^{-5} \text{ mol.}$$

3) Find the amount of substance of CrCl₃:

$$n(\text{CrCl}_3) = n_{\text{total}}(\text{EDTA}) - n(\text{EDTA}_{\text{Zn}^{2+}}) = (5.15 - 1.4784) * 10^{-5} = 3.6716 * 10^{-5} \text{ mol.}$$

4) Find the mass of CrCl₃:

$$m(\text{CrCl}_3) = n(\text{CrCl}_3) * M(\text{CrCl}_3) = 3.6716 * 10^{-5} * 158.36 \approx 5.8143 * 10^{-3} \text{ g.}$$

5) Find the mass percentage of CrCl₃ in the sample:

$$w(\text{CrCl}_3) = \frac{m(\text{CrCl}_3)}{m(\text{sample})} * 100\% = \frac{5.8143 * 10^{-3}}{2.63} * 100\% \approx 0.2211\%.$$

Answer: the weight percentage of CrCl₃ in the sample is 0.2211%.