Answer on Question #81816 – Chemistry – Other

Task:

The Zn in 0.7556-g sample of foot powder was titrated with 21.27 mL of 0.01645 M EDTA. Calculate the percentage of Zn in this sample.

Solution:

Reagents for EDTA titrations: EDTA, H_4Y and $Na_2H_2Y \cdot 2H_2O$.

Complexes of EDTA and metal ions (1:1).

$$Zn^{2+} + H_2Y^{2-} = ZnH_2Y$$

$$n(\mathrm{Zn}^{2+}) = n(H_2Y^{2-});$$

$$C = \frac{n}{V}; \quad \Rightarrow \quad n = C * V$$

$$V(H_2Y^{2-}) = 21.27\,mL = 0.02127\,L;$$

$$n = \frac{m}{M}; \quad M(Zn) = 65.38\,{}^{g}\!/_{mol};$$

$$\frac{m(Zn)}{M(Zn)} = C(H_2Y^{2-}) * V(H_2Y^{2-});$$

$$\frac{m(Zn)}{65.38\,{}^{g}\!/_{mol}} = 0.01645M * 0.02127\,\mathrm{L};$$

$$m(Zn) = 65.38\,{}^{g}\!/_{mol} * 0.01645M * 0.02127L = 0.022876g$$

$$w(Zn) = \frac{m(Zn)}{m(sample)} * 100\% = \frac{0.022876\ g}{0.7556\ g} * 100\% = 3.0275\%$$

$$\mathrm{w(Zn)} = 3.0275\%$$

Answer: 3.0275% of Zn.