

Answer on Question #43508 - Chemistry - Inorganic Chemistry

Question:

Calculate the percentage of each element in the following compounds: CH₂O and NH₄N₃.

Solution:

Relative molecular mass of CH₂O:

$$M_r(\text{CH}_2\text{O}) = A_r(\text{C}) + 2 \cdot A_r(\text{H}) + A_r(\text{O}) = 12 + 2 \cdot 1 + 16 = 30,$$

where $A_r(\text{C})$, $A_r(\text{H})$ and $A_r(\text{O})$ relative atomic masses of C, H and O, respectively.

Percentage of each element:

$$\%(\text{C}) = A_r(\text{C}) / M_r(\text{CH}_2\text{O}) \cdot 100 = 12/30 \cdot 100 = 40.0\%$$

$$\%(\text{H}) = 2 \cdot A_r(\text{H}) / M_r(\text{CH}_2\text{O}) \cdot 100 = 2 \cdot 1/30 \cdot 100 = 6.7\%$$

$$\%(\text{O}) = A_r(\text{O}) / M_r(\text{CH}_2\text{O}) \cdot 100 = 16/30 \cdot 100 = 53.3\%$$

Relative molecular mass of NH₄N₃:

$$M_r(\text{NH}_4\text{N}_3) = 4 \cdot A_r(\text{N}) + 4 \cdot A_r(\text{H}) = 4 \cdot 14 + 4 \cdot 1 = 60,$$

Percentage of each element:

$$\%(\text{N}) = 4 \cdot A_r(\text{N}) / M_r(\text{NH}_4\text{N}_3) \cdot 100 = 4 \cdot 14/60 \cdot 100 = 93.3\%$$

$$\%(\text{H}) = 4 \cdot A_r(\text{H}) / M_r(\text{NH}_4\text{N}_3) \cdot 100 = 4 \cdot 1/60 \cdot 100 = 6.7\%$$

Answer:

In CH₂O:

$$\%(\text{C}) = 40.0\%,$$

$$\%(\text{H}) = 6.7\%,$$

$$\%(\text{O}) = 53.3\%.$$

In NH₄N₃:

$$\%(\text{N}) = 93.3\%,$$

$$\%(\text{H}) = 6.7\%.$$