

Answer on Question #44458 - Chemistry – Physical Chemistry

A sample of hydrated zinc sulfate, $\text{ZnSO}_4 \cdot x\text{H}_2\text{O}$, weighing 3.59g was heated to a constant mass in a crucible to give 2.01g of solid residue.

- How many moles of solid residue remained in the crucible?
- How many moles of substance were lost during the experiment?
- Calculate the value of x in the formula $\text{ZnSO}_4 \cdot x\text{H}_2\text{O}$.

Answer:

$$M(\text{ZnSO}_4) = 161 \text{ g/mol}$$

$$M(\text{H}_2\text{O}) = 18 \text{ g/mol}$$

$$m(\text{ZnSO}_4) = 2.01 \text{ g}$$

$$m(\text{ZnSO}_4 \cdot x\text{H}_2\text{O}) = 3.59 \text{ g}$$

$$\text{a) } n(\text{ZnSO}_4) = m/M = 2.01/161 = 0.012 \text{ mol}$$

$$\text{b) } n(\text{H}_2\text{O}) = m/M = (3.59 - 2.01)/18 = 0.083 \text{ mol}$$

$$\text{c) } x = n(\text{ZnSO}_4)/n(\text{H}_2\text{O}) = 0.012/0.083 = 7$$

