



If you start with 1.45 g of barium chloride dihydrate, how many grams of barium chloride monohydrate could be produced in this thermal decomposition reaction?

$$\begin{array}{l} \text{BaCl}_2: \quad \text{Ba}: 137.3 \\ \quad \quad \quad \text{Cl}: \frac{35.45 \times 2}{208.7} \end{array}$$

$$\begin{array}{l} \text{H}_2\text{O}: \quad \text{H}: 1.008 \times 2 \\ \quad \quad \quad \text{O}: 16.00 \\ \hline 18.016 \end{array}$$

$$\text{BaCl}_2 \cdot 2\text{H}_2\text{O}: 244.232$$

$$\text{BaCl}_2 \cdot \text{H}_2\text{O}: 226.216$$

$$\underline{226.216 \text{ g BaCl}_2 \cdot \text{H}_2\text{O} = 1 \text{ mol BaCl}_2 \cdot \text{H}_2\text{O} \quad | \quad 244.232 \text{ g BaCl}_2 \cdot 2\text{H}_2\text{O} = 1 \text{ mol BaCl}_2 \cdot 2\text{H}_2\text{O}}$$

$$1 \text{ mol BaCl}_2 \cdot 2\text{H}_2\text{O} = 1 \text{ mol BaCl}_2 \cdot \text{H}_2\text{O}$$

$$1.45 \text{ g BaCl}_2 \cdot 2\text{H}_2\text{O} \times \frac{1 \text{ mol BaCl}_2 \cdot 2\text{H}_2\text{O}}{244.232 \text{ g BaCl}_2 \cdot 2\text{H}_2\text{O}} \times \frac{1 \text{ mol BaCl}_2 \cdot \text{H}_2\text{O}}{1 \text{ mol BaCl}_2 \cdot 2\text{H}_2\text{O}} =$$

$$= \boxed{0.005937 \text{ mol BaCl}_2 \cdot \text{H}_2\text{O}} \quad (0.00594 \text{ mol})$$

$$0.005937 \text{ mol BaCl}_2 \cdot \text{H}_2\text{O} \times \frac{226.216 \text{ g BaCl}_2 \cdot \text{H}_2\text{O}}{1 \text{ mol BaCl}_2 \cdot \text{H}_2\text{O}} = \boxed{1.34 \text{ g BaCl}_2 \cdot \text{H}_2\text{O}}$$

Steps:

- 1 - Convert mass of dihydrate to moles dihydrate (use FW)
- 2 - Convert moles dihydrate to moles monohydrate (use equation)
- 3 - Convert moles monohydrate to mass monohydrate (use FW)