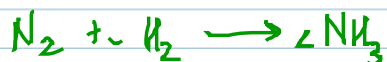


STOICHIOMETRY

mole ratio



Coefficients can represent moles

If I needed to produce 12.90 moles of NH_3 , how many moles of H_2 should I start with?

$$12.90 \text{ mol NH}_3 \times \frac{3 \text{ mol H}_2}{2 \text{ mol NH}_3} = 19.35 \text{ mol H}_2$$

3 steps

- 1) get to moles
- 2) switch your moles (mole ratio)
- 3) get out of moles



How many grams of HCl can be neutralized by 0.50 g of CaCO_3 ?

$$0.50 \text{ g CaCO}_3 \times \frac{1 \text{ mol}}{100.09 \text{ g}} = 0.0050 \text{ mol CaCO}_3$$

$$\text{Ca}: 1 \times 40.08 = 40.08$$

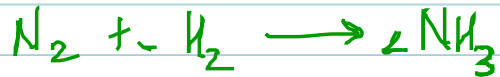
$$\text{C}: 1 \times 12.01 = 12.01$$

$$\text{O}: 3 \times 16.00 = 48.00$$

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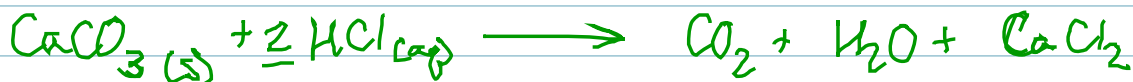
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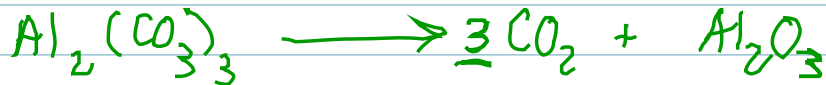
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$$0.0050 \text{ mol CaCO}_3 \times \frac{2 \text{ mol HCl}}{1 \text{ mol CaCO}_3} = 0.010 \text{ mol HCl}$$

$$0.010 \text{ mol HCl} \times \frac{36.46 \text{ g}}{1 \text{ mol}} = 0.36 \text{ g HCl}$$

$$\begin{array}{r} \text{H: } 1.01 \\ \text{Cl: } 35.45 \\ \hline 36.46 \text{ g} \end{array}$$



If I decompose 4.60 g of $\text{Al}_2(\text{CO}_3)_3$, how many grams of CO_2 are produced?

$$4.60 \text{ g Al}_2(\text{CO}_3)_3 \times \frac{1 \text{ mol}}{233.99 \text{ g}} \times \frac{3 \text{ mol CO}_2}{1 \text{ mol Al}_2(\text{CO}_3)_3} \times \frac{44.01 \text{ g}}{1 \text{ mol}}$$

$$= \boxed{2.60 \text{ g CO}_2}$$