

Solutions

2.1 $\text{Mr}(\text{NaOH}) = 40$; moles $= 8.0 \div 40 = 0.2$.

2.2 $0.25 \times 100 = 25 \text{ g}$.

2.3 The equation ratio $\text{NaOH} : \text{HCl}$ is $1 : 1$, and the moles are equal, so both are fully used.

3.1 $\text{Mr}(\text{CaCO}_3) = 100$, moles $= 10.0 \div 100 = 0.10$; ratio $1 : 1$, so 0.10 mol CO_2 ; $\text{Mr}(\text{CO}_2) = 44$; mass $= 0.10 \times 44 = 4.4 \text{ g}$.

3.2 Moles $\text{Mg} = 6.0 \div 24 = 0.25$; moles $\text{O}_2 = 4.0 \div 32 = 0.125$; ratio needs 2 Mg per 1 O_2 , so 0.125 mol O_2 requires 0.25 mol Mg – exactly what is present: neither is limiting / both fully react; moles $\text{MgO} = 0.25$; mass $= 0.25 \times 40 = 10.0 \text{ g}$.

3.3 g/dm^3 : 3.5 g in $0.250 \text{ dm}^3 \rightarrow 3.5 \div 0.25 = 14 \text{ g/dm}^3$; $\text{Mr}(\text{NaCl}) = 58.5$; $\text{mol/dm}^3 = 14 \div 58.5 = 0.24 \text{ mol/dm}^3$.