

Solutions

2.1 $4 \text{ Al} + 3 \text{ O}_2 \rightarrow 2 \text{ Al}_2\text{O}_3$.

2.2 $2 \times (14 + 4) + 32 + 64 = 36 + 32 + 64 = 132$.

2.3 Carbon dioxide gas.

3.1 Copper combines with oxygen from the air; the oxygen's mass adds to the solid; mass gain = $5.63 - 5.00 = 0.63$ g of oxygen; total reactant mass (copper + oxygen) equals product mass – conservation of mass holds once the gas is counted.

3.2 $\text{Mr}(\text{H}_2\text{SO}_4) = 2 + 32 + 64 = 98$; sulfur contributes 32; $\%S = 32/98 \times 100 = 32.65\% \approx 32.7\%$.

3.3 The anomalous 24.80 is excluded; mean = $(24.10 + 24.20 + 24.30) \div 3 = 24.20 \text{ cm}^3$; uncertainty $\pm \text{range}/2 = \pm 0.10 \text{ cm}^3$.