Year 12 Chemistry

Quick Quiz: Concentrations for samples

SOLUTIONS

1. 3.2 ppb Al^{3+}

   $= 3.2\ \mu g\ L^{-1}$

   $m = CV$

   $= 3.2 \times 0.150$

   $= 0.48\ \mu g$

   $\frac{0.48}{5.6} = 0.086\ \mu g\ g^{-1}$

2. Moles of HCl before reaction:

   $n = C \times V$

   $= 1.0 \times 0.100$

   $= 0.10$ mol

   Moles of HCl remaining after reaction:

   $n = C \times V$

   $= 0.79 \times 0.100$

   $= 0.079$ mol

   ∴ Moles of HCl used up:

   $0.10 - 0.079 = 0.021$ mol

   Mole ratio $\frac{n_{Mg(OH)_2}}{n_{HCl}} = \frac{1}{2}$

   ∴ Moles of $Mg(OH)_2$ used up:

   $0.021 \times \frac{1}{2} = 0.011$ mol

   $M_{Mg(OH)_2} = 24.31 + (16.00 + 1.008 \times 2) = 58.326\ g\ mol^{-1}$

   ∴ Mass of $Mg(OH)_2$ in the two tablets:

   $m = n \times M$

   $= 0.011 \times 58.326$

   $= 0.61$ g

   ∴ Concentration in the tablets:

   $\frac{0.61}{2.4} \times 100 = 26$ %w/w