

Appendix 1

Calculation of μ_{eff} : [Cu₂(*p*-H₂NC₆H₄COO)₂(CH₃(CH₂)₁₄COO)₂(H₂O)(CH₃CH₂OH)]

Step 1: Gram susceptibility

$$\chi_g = 0.273 \times 10^{-5} \text{ (reading from the Gouy balance)}$$

Step 2: Diamagnetic correction, χ_{dia}

$$\begin{aligned} 2 \text{ Cu}^{2+} &= 2 \times (-13.00 \times 10^{-6}) = -2.60 \times 10^{-5} \\ 2 \text{ C=O} &= 2 \times (6.30 \times 10^{-6}) = 1.26 \times 10^{-5} \\ 34 \text{ C}_{\text{aliphatic}} &= 34 \times (-6.00 \times 10^{-6}) = -2.04 \times 10^{-4} \\ 12 \text{ C}_{\text{aromatic}} &= 12 \times (-6.24 \times 10^{-6}) = -7.49 \times 10^{-5} \\ 82 \text{ H} &= 82 \times (-2.93 \times 10^{-6}) = -2.40 \times 10^{-4} \\ 2 \text{ N} &= 2 \times (-5.57 \times 10^{-6}) = -1.11 \times 10^{-5} \\ 8 \text{ O} &= 8 \times (-4.61 \times 10^{-6}) = -3.69 \times 10^{-5} \\ \hline \chi_{\text{dia}} &= -5.81 \times 10^{-4} \end{aligned}$$

Step 3: Molar susceptibility, χ_m

$$\begin{aligned} \chi_m &= \chi_g \times \text{FW} \\ &= (0.273 \times 10^{-5}) \times 974.3 \text{ g/mol} \\ &= 2.6598 \times 10^{-3} \end{aligned}$$

Step 4: Corrected molar susceptibility, χ_m^{corr}

$$\begin{aligned} \chi_m^{\text{corr}} &= \chi_m - \chi_{\text{dia}} \\ &= (2.6598 \times 10^{-3}) - (-5.81 \times 10^{-4}) \\ &= 3.24 \times 10^{-3} \end{aligned}$$

Step 5: Room-temperature effective magnetic moment, μ_{eff}

$$\begin{aligned} \mu_{\text{eff}} &= 2.83[\text{T}(\chi_m^{\text{corr}} - N\alpha)]^{1/2} \\ &= 2.83[298(3.24 \times 10^{-3} - 120 \times 10^{-6})]^{1/2} \\ &= 2.73 \text{ B.M} \end{aligned}$$

$N\alpha$ = Temperature independent paramagnetic (TIP) = 60×10^{-6} c.g.s. per copper(II) ion