

Biophysical Chemistry

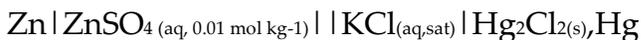
Week 5 Problems

To be handed in by Thursday 30th March 2017, 17:00

(either at my office 01/05 under the door or at the secretary's office 3rd floor or in exceptional circumstances as a *single pdf file* via e-mail)

1. The standard potentials for the electrodes $\text{Ag}^+(\text{aq})|\text{Ag}$ and $\text{Cl}^-(\text{aq})|\text{AgCl}(\text{s}),\text{Ag}$ are +0.7991 V and +0.2224 V respectively at 298K. Calculate the *solubility product* of silver chloride ($K_{\text{AgCl}} = a_{\text{Ag}^+} \times a_{\text{Cl}^-}$) and the *solubility* of silver chloride (concentration) in pure water at this temperature.

2. Calculate the e.m.f. at 298 K of the cell



At 298 K the standard potential of the zinc electrode is -0.763 V, the mean ionic activity coefficient, γ_{\pm} , of 0.01 mol kg⁻¹ ZnSO₄ is 0.387 and the potential of the saturated calomel electrode is +0.242 V.

NB (*nota bene*): Use Nernst equation (top of p. 109)

Calculate both on the basis of concentration and of activity, i.e., the activity of Zn²⁺, which is assumed to equal the activity of SO₄²⁻, is the concentration multiplied by the activity coefficient γ .