

Biophysical Chemistry

Week 7 Problems

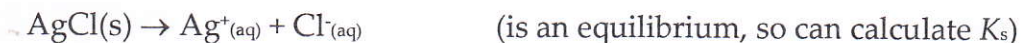
To be handed in by Friday 10th May 2013, 17:00

(either at my office 01/05 under the door or at the secretary's office 3rd floor)

1. The vapour pressure of a solution consisting of 10g of an involatile substance A in 75 g propanone was $2.974 \times 10^4 \text{ N/m}^2$ at 298 K. The vapour pressure of pure propanone at this temperature is $3.055 \times 10^4 \text{ N/m}^2$. Calculate the relative molar mass of the substance A given the following relative molar masses: C, 12; O, 16; H, 1. (NB: you must also calculate the relative molar mass of the propanone.)

2. AgCl dissolves in pure water at 25 °C to a concentration of $1.26 \times 10^{-5} \text{ mol/L}$.

(a) Calculate the standard Gibbs free energy of the reaction:



(b) Calculate also the solubility of AgCl in 0.02 mol/L $\text{K}_2\text{SO}_{4\text{(aq)}}$

Note: calculate the ionic strength 'I' assuming [AgCl] is small and from 'I' calculate $\log_{10} \gamma$. The solubility is then $(\sqrt{K_s})/\gamma$.

(c) What type of effect is being observed when having more 'salt' in the system?