**Chemical Potentials: Solutes**

A given aqueous solution is prepared using 1 kg of water at temperature $T$ and pressure $p$. The molality of solute $j$ is $m_j$. The chemical potential of solute $j$, $\mu_j(aq; T; p)$, is related to $m_j$ using equation (a).

$$\mu_j(aq; T; p) = \mu_j^0(aq; T) + R \cdot T \cdot \ln(m_j \cdot \gamma_j / m^0) + \int_{p^0}^{p} V_j(aq; T) \cdot dp$$  \hspace{1cm} (a)

By definition, $\lim_{m_j \to 0} \gamma_j = 1.0$ \hspace{1cm} (b)

$\mu_j^0(aq; T)$ is the chemical potential of solute $j$ in an ideal solution (where $\gamma_j = 1$) at temperature $T$ and standard pressure $p^0 = 10^5 \text{ Pa}$.

For solutions at ambient pressure which is close to $p^0$, $\mu_j(aq; T; p)$ is related to $m_j$ using equation (c).

$$\mu_j(aq) = \mu_j^0(aq) + R \cdot T \cdot \ln(m_j \cdot \gamma_j / m^0)$$ \hspace{1cm} (c)

Henry’s law forms the basis of equations (a) and (c).