5.10 Activity of solutions of condensed systems (liquid, solid)

Completely analogously to the fugacity in Eq. (3.79) we now define the activity a_k to describe non-idealities of mixing with respect to a component k in the mixture; for the chemical potential of component k we find

$$a_{k} = x_{k}\gamma_{k}$$

$$\mu_{k} = \mu_{k}^{0} + RT \ln a_{k} = \mu_{k}^{0} + RT \ln x_{k} + RT \ln \gamma_{k} = \mu_{k}^{id} + \mu_{k}^{ex}$$

$$\Rightarrow \mu_{k}^{id} = \mu_{k}^{0} + RT \ln x_{k} \quad \text{and} \quad \mu_{k}^{ex} = RT \ln \gamma_{k}$$
(5.30)

Again we introduced an activity coefficient γ_k which is determined by μ_k^{ex} . As we will see, the general problem is what kind of state is defined as standard:

- For ideal samples: pure component, standard conditions.
- For solvents of a liquid solution: pure component.

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• For solutes of a liquid solution: hypothetical standard.

For the standard state we always assume the pure component and $\gamma = 1$. For the notation of the standard states by convention "A" is the solvent, "B" is the solute, and "*" indicates the pure phase.