

$$X_i^{\phi} \left(\frac{\sum_{j=1}^{n-1} X_j^B \exp(-\Delta G_j/RT) + X_n^B}{\sum_{j=1}^{n-1} X_j^B \exp(-\Delta G_j/RT)} \right) = \frac{X_i^B \exp(-\Delta G_i/RT)}{\sum_{j=1}^{n-1} X_j^B \exp(-\Delta G_j/RT)}$$

$$X_n^B = 1 - \sum_{j=1}^{n-1} X_j^B$$

$$X_i^{\phi} \left(\frac{1 + \sum_{j=1}^{n-1} X_j (\exp(-\Delta G_j/RT) - 1)}{\sum_{j=1}^{n-1} X_j^B \exp(-\Delta G_j/RT)} \right) = \frac{X_i^B \exp(-\Delta G_i/RT)}{\sum_{j=1}^{n-1} X_j^B \exp(-\Delta G_j/RT)}$$

$$X_i^{\phi} = \frac{X_i^B \exp(-\Delta G_i/RT)}{1 + \sum_{j=1}^{n-1} X_j (\exp(-\Delta G_j/RT) - 1)}$$