○ 상평형 조건식

$$\mu_A^\alpha = \mu_A^\beta \quad , \mu_B^\alpha = \mu_B^\beta$$

정규용액 모델이므로

$$G^\alpha = X_A^\alpha G_A^\circ + X_B^\alpha G_B^\circ + RT(X_A^\alpha \ln X_A^\alpha + X_B \ln X_B^\alpha) + w^\alpha X_A^\alpha X_B^\alpha$$

$$G^\beta = X_A^\beta G_A^\circ + X_B^\beta G_B^\circ + RT(X_A^\beta \ln X_A^\beta + X_B^\beta \ln X_B^\beta) + w^\beta X_A^\beta X_B^\beta$$

$$\mu_A^\alpha = \frac{dG^\alpha}{dX_A^\alpha} = G_A^\circ - G_B^\circ + RT(\ln X_A^\alpha + 1 - \ln(1-X_A^\alpha) - 1) + w^\alpha(1-X_A^\alpha) - w^\alpha X_A^\alpha$$

$$\mu_A^\beta = \frac{dG^\beta}{dX_A^\beta} = G_A^\circ - G_B^\circ + RT(\ln X_A^\beta + 1 - \ln(1-X_A^\beta) - 1) + w^\beta(1-X_A^\beta) - w^\beta X_A^\beta$$

$$\mu_A^\alpha = \mu_A^\beta \Rightarrow \mu_A^\alpha - \mu_A^\beta = 0.$$

$$\mu_A^\alpha - \mu_A^\beta = RT\ln\left(\frac{X_A^\alpha(1-X_A^\beta)}{(1-X_A^\alpha)X_A^\beta}\right) + w^\alpha - w^\beta \cancel{- 2(X_A^\alpha - X_A^\beta)}$$

$$- 2w^\alpha X_A^\alpha + 2w^\beta X_A^\beta = 0$$

따라서 reference state에 무관하게 상평형 조성은 결정.