$M + S \rightleftharpoons C$

M = Metal

S = Substrate (IECG)

C = M·S (complex)

$K_S = \dfrac{[C]}{[M][S]}$

$\delta_{obs} = \delta_F X_F + \delta_C X_C$

δ_C, δ_F = chem sh. IFPS

$X_{F,C}$ = mole fraction

$X_F = \dfrac{a}{M+C}$ $\quad X_C = 1 - X_F$

Let $\delta_F = 0$

$\therefore \delta_{obs} = \delta_C X_C + \cancel{\delta_F X_F}$ ($\delta_F \to 0$)

$= \delta_C [1 - X_F]$

$= \delta_C \left[1 - \dfrac{a}{M+C}\right]$

$\delta_{obs} = \delta_C - \delta_C \left(\dfrac{a}{M+C}\right)$

$$\boxed{\delta_C - \delta_{obs} = \delta_C \left(\frac{a}{M+C}\right)}$$

$$\delta_c - \delta_{obs} = \delta_c \left(\frac{M}{M+C}\right) \quad \} \text{ rearrange}$$

$$(\delta_c - \delta_{obs})(M+C) = \delta_c M$$

$$\delta_c M + \delta_c C - \delta_{obs} M - \delta_{obs} C = \delta_c M \quad \} \times \frac{1}{M \cdot S}$$

$$\frac{\delta_c M}{M S} + \frac{\delta_c C}{M S} - \frac{\delta_{obs} M}{M S} - \frac{\delta_{obs} C}{M S} = \frac{\delta_c M}{M S}$$

$$\frac{\delta_c}{S} + \frac{\delta_c C}{M S} - \frac{\delta_{obs}}{S} - \frac{\delta_{obs} C}{M S} = \frac{\delta_c}{S}$$

$$\frac{\delta_{obs} C}{M S} + \frac{\delta_{obs}}{S} = \frac{\delta_c C}{M S}$$

$$\boxed{\frac{\delta_{obs}}{S} = -\frac{\delta_{obs} C}{M S} + \frac{\delta_c C}{M S}}$$

$$K_S = \frac{C}{M S} \qquad M + S \rightleftharpoons C$$

$$\therefore \boxed{\frac{\delta_{obs}}{S} = -\delta_{obs} K_S + \delta_c K_S}$$

$$y = m x + b$$

$4 \cdot M + S \rightleftharpoons C$

M = Metal
S = Substrate
C = complex

$$K_S = \frac{[C]}{[M]^4 S}$$

$$\delta_{obs} = \delta_F X_F + \delta_C X_C$$

$$X_F = \frac{[M]^4}{[M]^4 + [C]} \qquad X_C = 1 - X_F$$

Let $\delta_F = 0$

$$\delta_{obs} = \cancel{\delta_F X_F}^{0} + \delta_C X_C$$

$$\delta_{obs} = \delta_C [1 - X_F]$$

$$\delta_{obs} = \delta_C - \delta_C \left[\frac{M^4}{M^4 + C} \right)$$

$$\delta_C - \delta_{obs} = \delta_C \left[\frac{M^4}{M^4 + C} \right]$$ rearrange

$$(\delta_C - \delta_{obs})(M^4 + C) = \delta_C M^4$$

$$\delta_C M^4 + \delta_C C - \delta_{obs} M^4 - \delta_{obs} C = \delta_C M^4$$

$$\delta_c M^4 + \delta_c C - \delta_{OSS} M^4 - \delta_{OSS} C = \delta_c M^4 \quad \left\{ \frac{1}{M^4 S} \right. \quad (2)$$

$$\frac{\delta_c M^4}{M^4 S} + \frac{\delta_c C}{M^4 S} - \frac{\delta_{OSS} M^4}{M^4 S} - \frac{\delta_{OSS} C}{M^4 S} = \frac{\delta_c M^4}{M^4 S}$$

$$\frac{\delta_c}{S} + \frac{\delta_c C}{M^4 S} - \frac{\delta_{OSS}}{S} - \frac{\delta_{OSS} C}{M^4 S} = \frac{\delta_c}{S}$$

$$\frac{\delta_{OSS}}{S} = -\frac{\delta_{OSS} C}{M^4 S} + \frac{\delta_c C}{M^4 S}$$

$$K_S = \frac{C}{M^4 S}$$

$$\boxed{\frac{\delta_{OSS}}{S} = -\delta_{OSS} K_S + \delta_c K_S}$$

$$y = mx + b$$

$$M + \tfrac{1}{4} S \rightleftharpoons C$$

$$K_S = \frac{C}{M S^{1/4}}$$

$$\delta_{obs} = \delta_F X_F + \delta_C X_C$$

$$X_F = \frac{M}{M+C} \qquad X_C = 1 - X_F$$

$$\delta_{obs} = \delta_C (1 - X_F) = \delta_C - \frac{\delta_C M}{M+C}$$

$$\delta_C - \delta_{obs} = \frac{\delta_C M}{M+C}$$

$$(\delta_C - \delta_{obs})(M+C) = \delta_C M$$

$$\delta_C M + \delta_C C - \delta_{obs} M - \delta_{obs} C = \delta_C M \quad \Big\} \times \frac{1}{M S^{1/4}}$$

$$\frac{\delta_C M}{M S^{1/4}} + \frac{\delta_C C}{M S^{1/4}} - \frac{\delta_{obs} M}{M S^{1/4}} - \frac{\delta_{obs} C}{M S^{1/4}} = \frac{\delta_C M}{M S^{1/4}}$$

$$\frac{\delta_C}{S^{1/4}} + \frac{\delta_C C}{M S^{1/4}} - \frac{\delta_{obs}}{S^{1/4}} - \frac{\delta_{obs} C}{M S^{1/4}} = \frac{\delta_C}{S^{1/4}}$$

$$\frac{\delta_c C}{m s^{1/4}} - \frac{\delta_{obs}}{s^{1/4}} - \frac{\delta_{obs} C}{m s^{1/4}} = 0$$

$$\frac{\delta_{obs}}{s^{1/4}} = \frac{\delta_c C}{m s^{1/4}} - \frac{\delta_{obs} C}{m s^{1/4}}$$

$$\frac{\delta_{obs}}{s^{1/4}} = -\frac{\delta_{obs} C}{m s^{1/4}} + \frac{\delta_c C}{m s^{1/4}}$$

$$K_s = \frac{C}{m s^{1/4}}$$

$$\boxed{\frac{\delta_{obs}}{s^{1/4}} = -\delta_{obs} K_s + \delta_c K_s}$$

$$y = mx + b$$