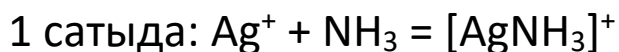
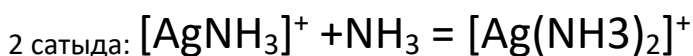


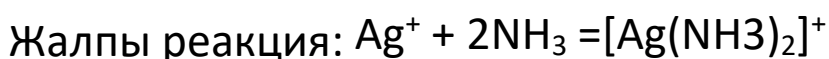
## 1) Комплексті ионның түзілуі



$$\beta_1^T = a(\text{Ag}(\text{NH}_3))/a(\text{Ag}^+) \cdot a(\text{NH}_3)$$



$$\beta_2^T = a(\text{Ag}(\text{NH}_3)_2)/a(\text{Ag}(\text{NH}_3)) \cdot a(\text{NH}_3)$$



$$\beta^T \text{Ж} = \beta_1^T * \beta_2^T = a(\text{Ag}(\text{NH}_3)_2)/a(\text{Ag}^+) \cdot a^2(\text{NH}_3)$$

$$a = f \cdot C$$

$$\beta^T \text{Ж} = \beta_1^T * \beta_2^T = f(\text{Ag}(\text{NH}_3)_2) * [\text{Ag}(\text{NH}_3)_2] /$$

$$f(\text{Ag}^+) [\text{Ag}^+] * f^2(\text{NH}_3) * [\text{NH}_3]^2$$

$$\beta^T \text{Ж} = \beta^C * f(\text{Ag}(\text{NH}_3)_2) / f(\text{Ag}^+) * f^2(\text{NH}_3)$$

$$\beta^C = \beta^T \text{Ж} * f(\text{Ag}^+) * f^2(\text{NH}_3) / f(\text{Ag}(\text{NH}_3)_2)$$

термодинамикалық және концентрациялық

тұрақтылық константалар арасында байланысты

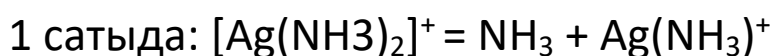
көрсетеді

$$\beta \text{Ж} = \beta_1 * \beta_2 * \beta_3 * \beta_4 * \dots * \beta_n$$

## 2) Диссоциация (ыдырау)



Сатылап



$$K_2 = [Ag^+][NH_3]/[Ag(NH_3)^+]$$

$$K_{ж} = K_1 \cdot K_2 \cdot \dots \cdot K_n$$

3) Тұрақтылық және тұрақсыздық константалар арасында байланыс

$$\beta_1 = 1/K_2; \quad \beta_2 = 1/K_1$$

$$\beta_1 \cdot \beta_2 \cdot \dots \cdot \beta_n = 1/K_1 \cdot K_2 \cdot \dots \cdot K_n$$

4) Комплекстену функция – F

$$F(L) = C_M / [M]$$

$$C_M = [M] + [ML] + [ML_2] + \dots + [ML_n];$$

$$C_M = [M] + \beta_1 \cdot [M] \cdot [L] + \beta_{1,2} [M] \cdot [L]^2 + \dots + \beta_{1,n} [M] \cdot [L]^n =$$

$$= [M](1 + \beta_1 \cdot [L] + \beta_{1,2} \cdot [L]^2 + \dots + \beta_{1,n} \cdot [L]^n);$$

$$\frac{C_M}{[M]} = F(L) = 1 + \beta_1 \cdot [L] + \beta_{1,2} \cdot [L]^2 + \dots + \beta_{1,n} \cdot [L]^n =$$

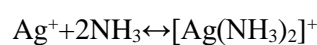
$$= 1 + \sum_{n=1}^{n=N} \beta_n \cdot [L]^n$$

N – максималды координациялық сан.

Мысалы,  $Ag^+ + NH_3 \leftrightarrow Ag(NH_3)^+$ :

$$\beta_1 = \frac{[Ag(NH_3)^+]}{[Ag^+] \cdot [NH_3]} = 6,6 \cdot 10^3;$$

$$[Ag(NH_3)^+] = \beta_1 \cdot [Ag^+] \cdot [NH_3]$$



$$\beta_{1,2} = \frac{[Ag(NH_3)_2^+]}{[Ag^+] \cdot [NH_3]^2} = 1,1 \cdot 10^7;$$

$$[Ag(NH_3)_2^+] = \beta_{1,2} \cdot [Ag^+] \cdot [NH_3]^2$$

$$C_{Ag^+} = [Ag^+] + [Ag(NH_3)^+] + [Ag(NH_3)_2^+] = [Ag^+] + \beta_1 \cdot [Ag^+] \cdot [NH_3] + \beta_{1,2} \cdot [Ag^+] \cdot [NH_3]^2 = [Ag^+] (1 + \beta_1 \cdot [NH_3] + \beta_{1,2} \cdot [NH_3]^2)$$

$$F(L) = \frac{C_{Ag^+}}{[Ag^+]} = 1 + \beta_1 \cdot [NH_3] + \beta_{1,2} \cdot [NH_3]^2$$

$$C(AgNO_3) = 1M$$

$$C(NH_4Cl) = 1M$$

1) pH=1

2) pH9

комплекс түзіле ма немесе түзілмей ма?