

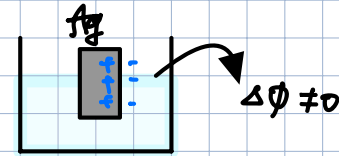
4. Nernst potential examples & Quiz

① Review

→ Nernst potential ϕ

- $\mu_i^a = \left(\frac{\partial G}{\partial n_i} \right)_{T,P,n}$
- $\bar{\mu}_i^a = \mu_i^a + z_i F \phi^a$
- $\mu_i^a = \mu_i^{oa} + RT \ln a_i^a$
- for uncharged species, $\bar{\mu}_i^a = \mu_i^a$

• Metal & metal ion

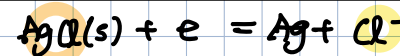
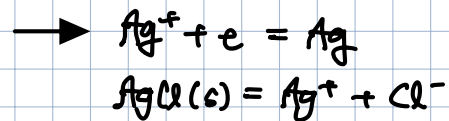
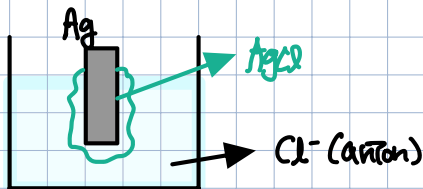


$$\Delta \phi(M.S) = \Delta \phi^o(M.S) + \frac{RT}{F} \ln a$$

$$[\because Ag^+ + e^- = Ag]$$

② Nernst potential examples

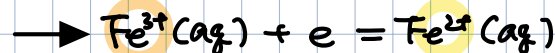
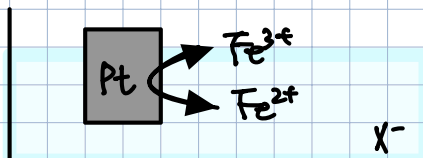
• Metal & Insoluble metal salt / anion



$$\Delta \phi(M.S) = \Delta \phi^o(M.S) + \frac{RT}{F} \ln \frac{1}{a_{Cl^-}}$$

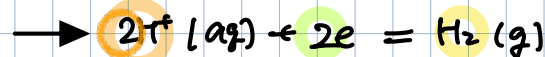
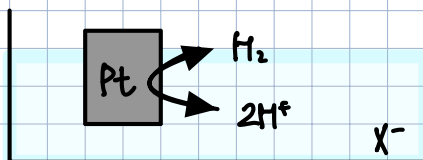
soluble
activity = 1

• Inert electrode / Redox pair



$$\Delta \phi(M.S) = \Delta \phi^o(M.S) + \frac{RT}{F} \ln \frac{a_{Fe^{3+}}}{a_{Fe^{2+}}}$$

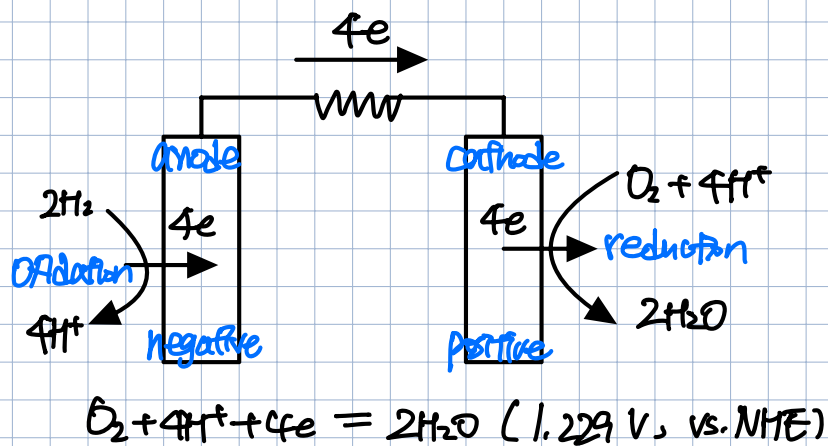
• Inert electrode / Gas / Ion



$$\Delta \phi(M.S) = \Delta \phi^o(M.S) + \frac{RT}{2F} \ln \frac{(a_{H^+})^2}{f_{H_2}}$$

fugacity

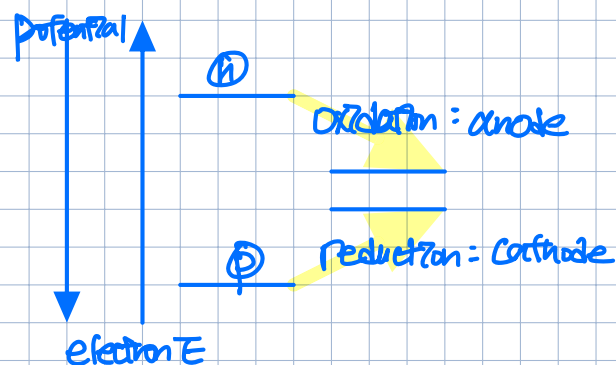
③ Quiz ①



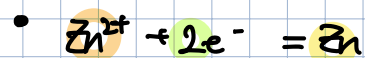
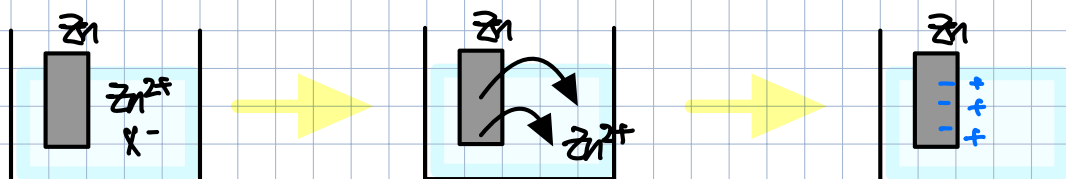
① Galvanic cell or electrolytic cell? : $-nFE < 0$

② cathode & anode? : oxidation : anode
reduction : cathode

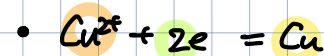
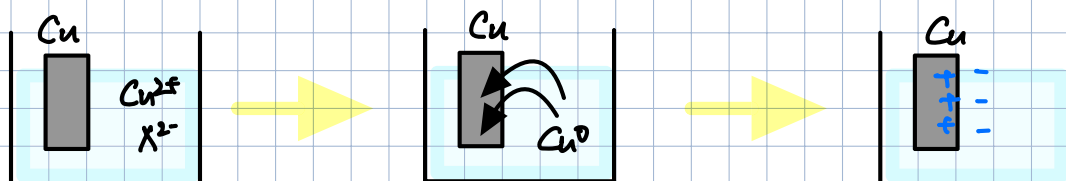
③ positive & negative electrode?



④ Quiz ②



• $\Delta\phi(M.S) = \Delta\phi^0(M.S) + \frac{RT}{2F} \ln a_{Zn^{2+}}^s$



• $\Delta\phi(M.S) = \Delta\phi^0(M.S) + \frac{RT}{2F} \ln a_{Cu^{2+}}^s$