

24. Electrochemistry

Starter Quiz · 课前小测

A-Level Chemistry

Name: _____ Score: _____

- At the cathode (negative electrode) in electrolysis:
 - ☐ positive ions gain electrons (reduction)
 - ☐ negative ions lose electrons
 - ☐ nothing happens
 - ☐ water is made
- The standard hydrogen electrode is defined as having a potential of:
 - ☐ 0.00 V
 - ☐ 1.00 V
 - ☐ -1.00 V
 - ☐ 0.059 V
- A redox reaction is feasible when the cell potential is:
 - ☐ positive
 - ☐ negative
 - ☐ zero only
 - ☐ equal to 0.059
- Electrolysing an aqueous solution of a reactive metal salt gives, at the cathode:
 - ☐ hydrogen (rather than the reactive metal)
 - ☐ the reactive metal
 - ☐ oxygen
 - ☐ the halogen
- The standard cell potential is:
 - ☐ $E^\circ(\text{more positive}) - E^\circ(\text{less positive})$
 - ☐ $E^\circ(\text{less positive}) - E^\circ(\text{more positive})$
 - ☐ the sum of the two E° values
 - ☐ always zero
- During electrolysis, positive ions move to the negative electrode, the _____.

- A more negative standard electrode potential means a stronger reducing agent.

☐ True ☐ False

- A reaction is feasible if the cell potential (E_{cell}) is positive.

☐ True ☐ False

- The link between cell potential and free energy is:

☐ $\Delta G^\circ = -n E^\circ_{\text{cell}} F$

☐ $\Delta G^\circ = n E^\circ_{\text{cell}} F$

☐ $\Delta G^\circ = E^\circ_{\text{cell}} / F$

☐ $\Delta G^\circ = F / E^\circ_{\text{cell}}$

- The charge passed during electrolysis is given by:

☐ $Q = It$ (current $\times$ time)

☐ $Q = I / t$

☐ $Q = F / e$

☐ $Q = m / M$

1. **positive ions gain electrons (reduction)**

Positive ions are attracted to the cathode and gain electrons (reduction); the anode does oxidation.

2. **0.00 V**

It is the reference half-cell, set at exactly 0.00 V; all other E° values are measured against it.

3. **positive**

A positive E°_{cell} means the reaction can happen (analogous to a negative ΔG).

4. **hydrogen (rather than the reactive metal)**

For a reactive metal, water is reduced to hydrogen at the cathode instead of the metal.

5. **$E^\circ(\text{more positive}) - E^\circ(\text{less positive})$**

Subtract the less positive electrode potential from the more positive one.

6. **cathode**

Reduction occurs at the cathode.

7. **True**

It loses electrons more readily.

8. **True**

$E_{\text{cell}} = E(\text{reduced}) - E(\text{oxidised})$.

9. **$\Delta G^\circ = -n E^\circ_{\text{cell}} F$**

$\Delta G^\circ = -nE^\circ_{\text{cell}}F$; a positive E°_{cell} gives a negative ΔG° (feasible).

10. **$Q = It$ (current $\times$ time)**

$Q = It$; then moles of electrons = Q/F , and the half-equation gives the moles of product.