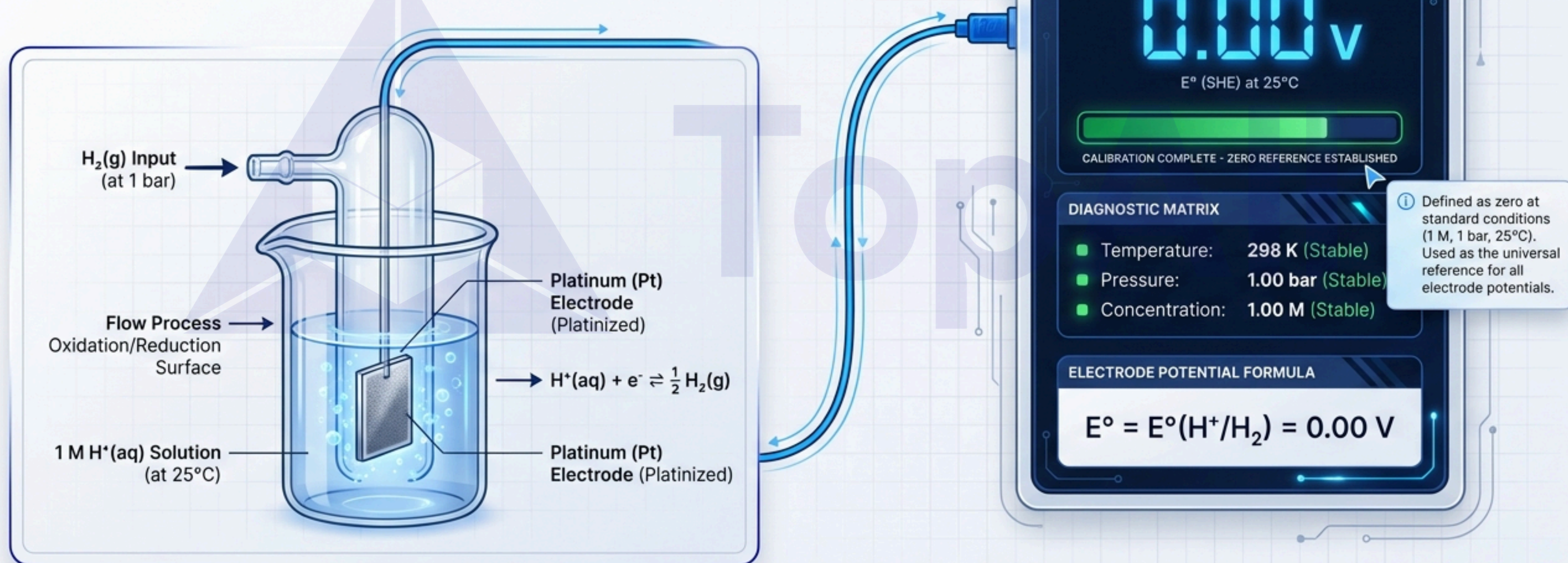
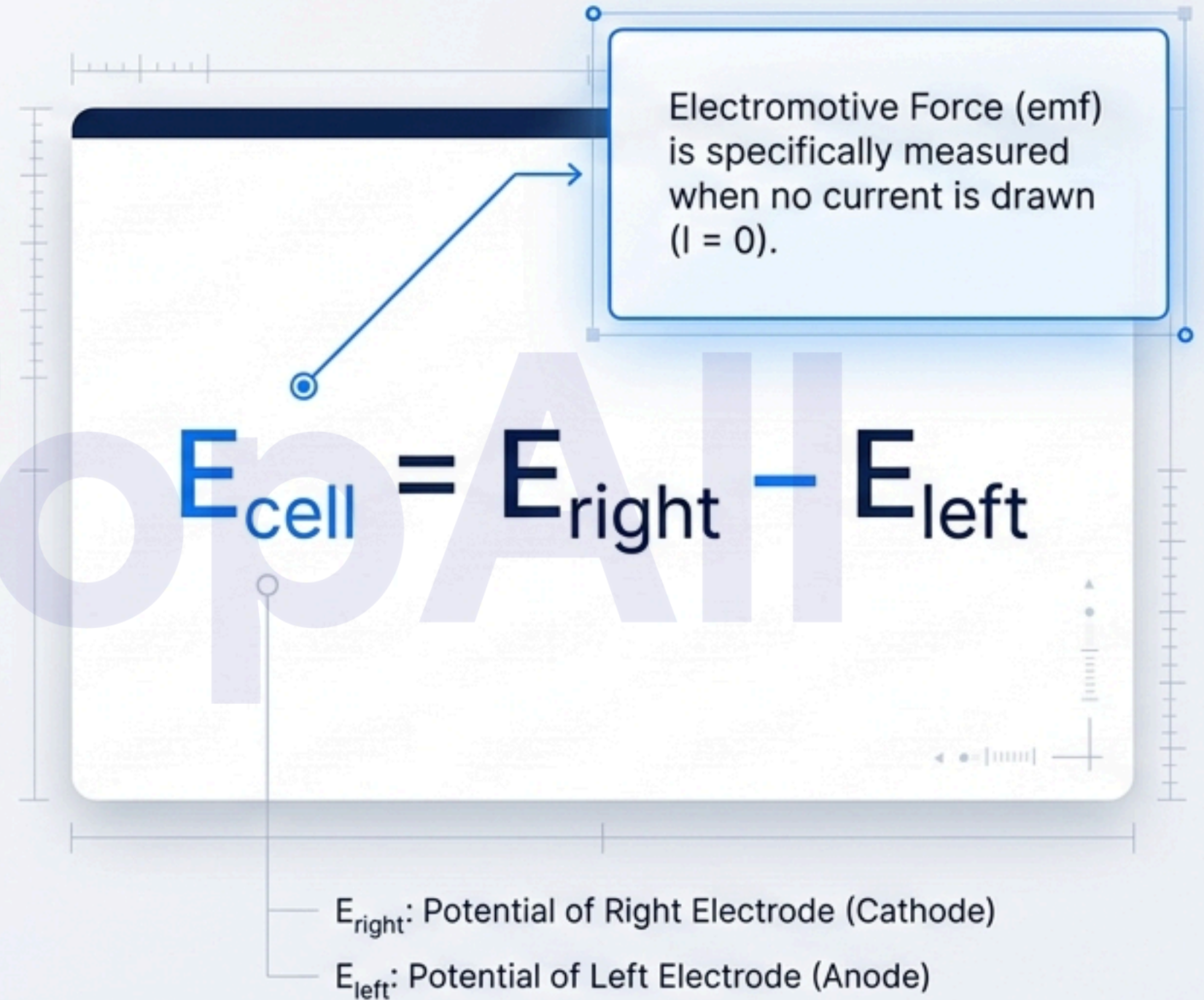
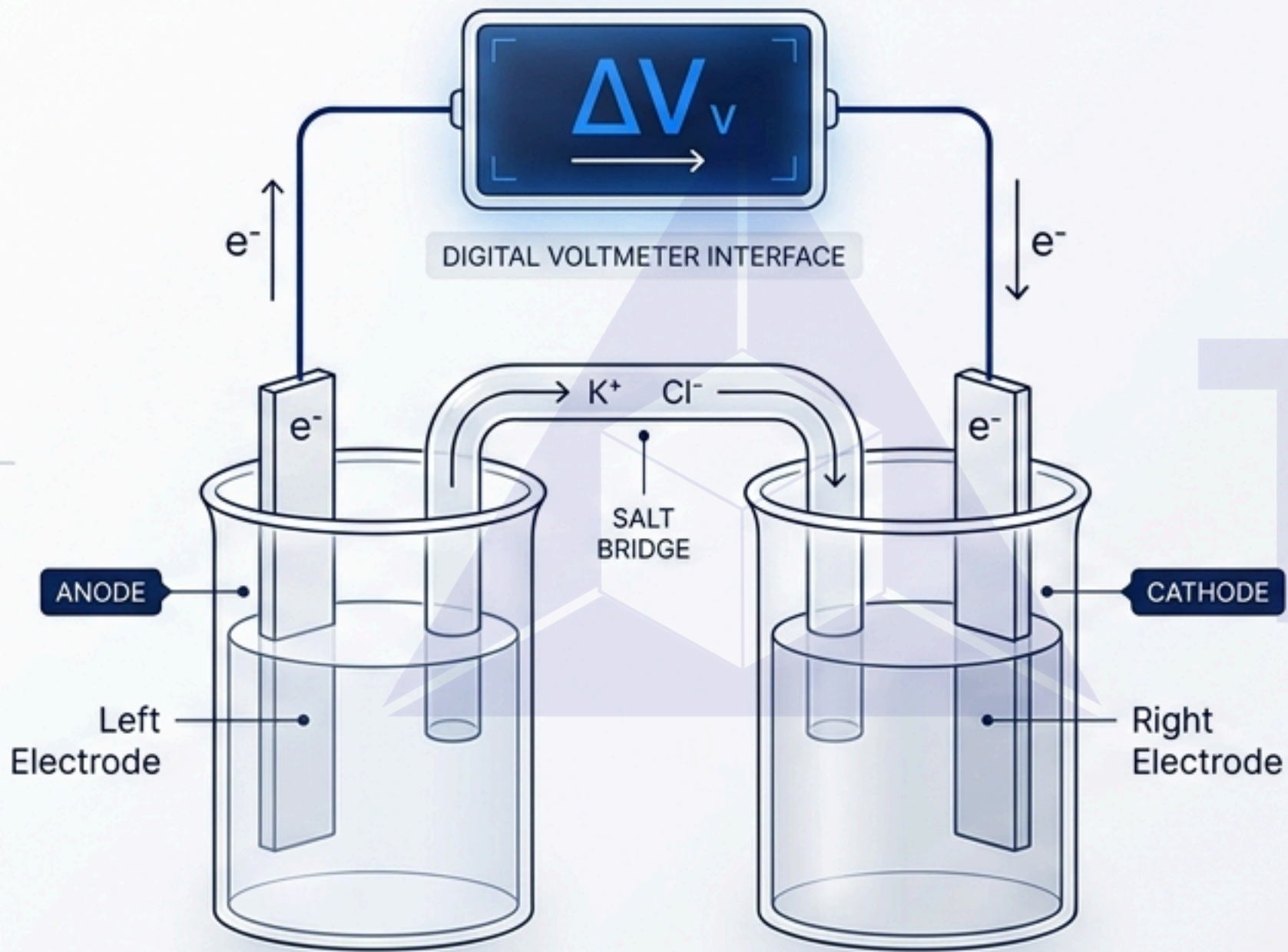


Standard Hydrogen Electrode

The Reference Point of Electrochemistry



Cell Potential

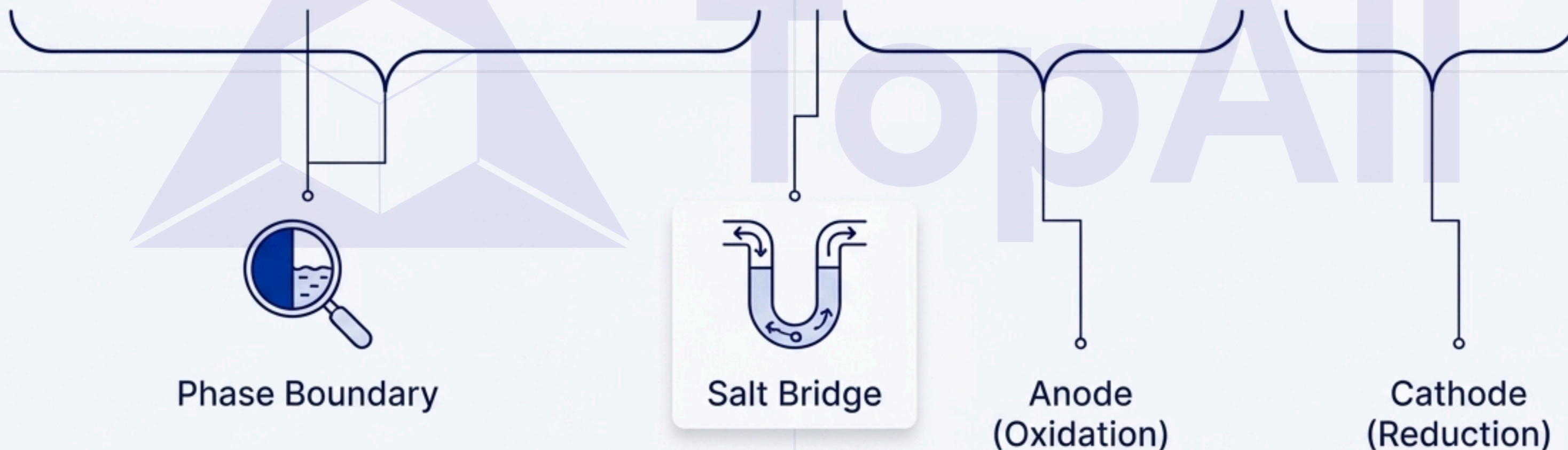


Electromotive Force (emf) is specifically measured when no current is drawn ($I = 0$).

$$E_{\text{cell}} = E_{\text{right}} - E_{\text{left}}$$

E_{right} : Potential of Right Electrode (Cathode)
 E_{left} : Potential of Left Electrode (Anode)

Decoding Cell Representation





You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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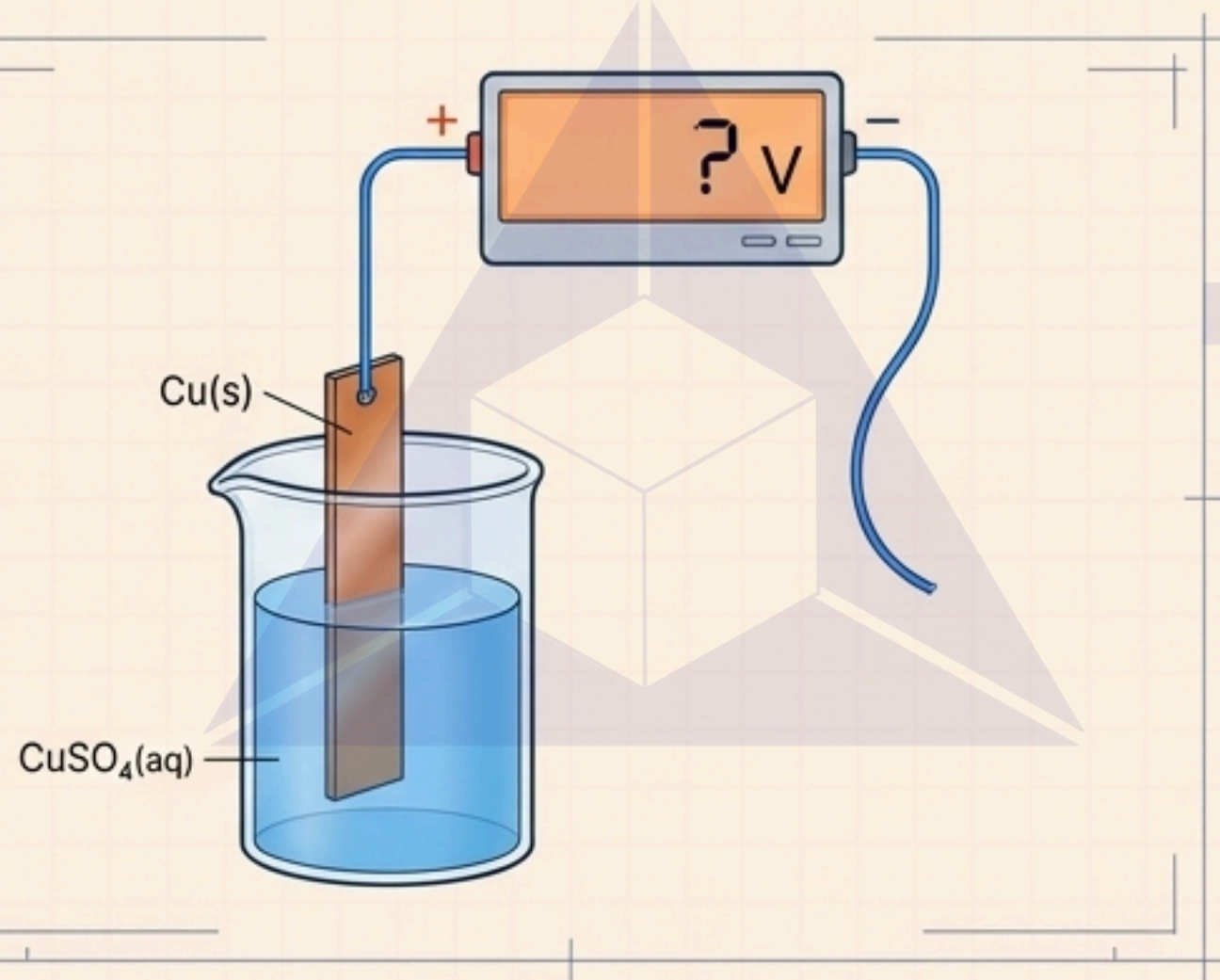
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Key Highlights

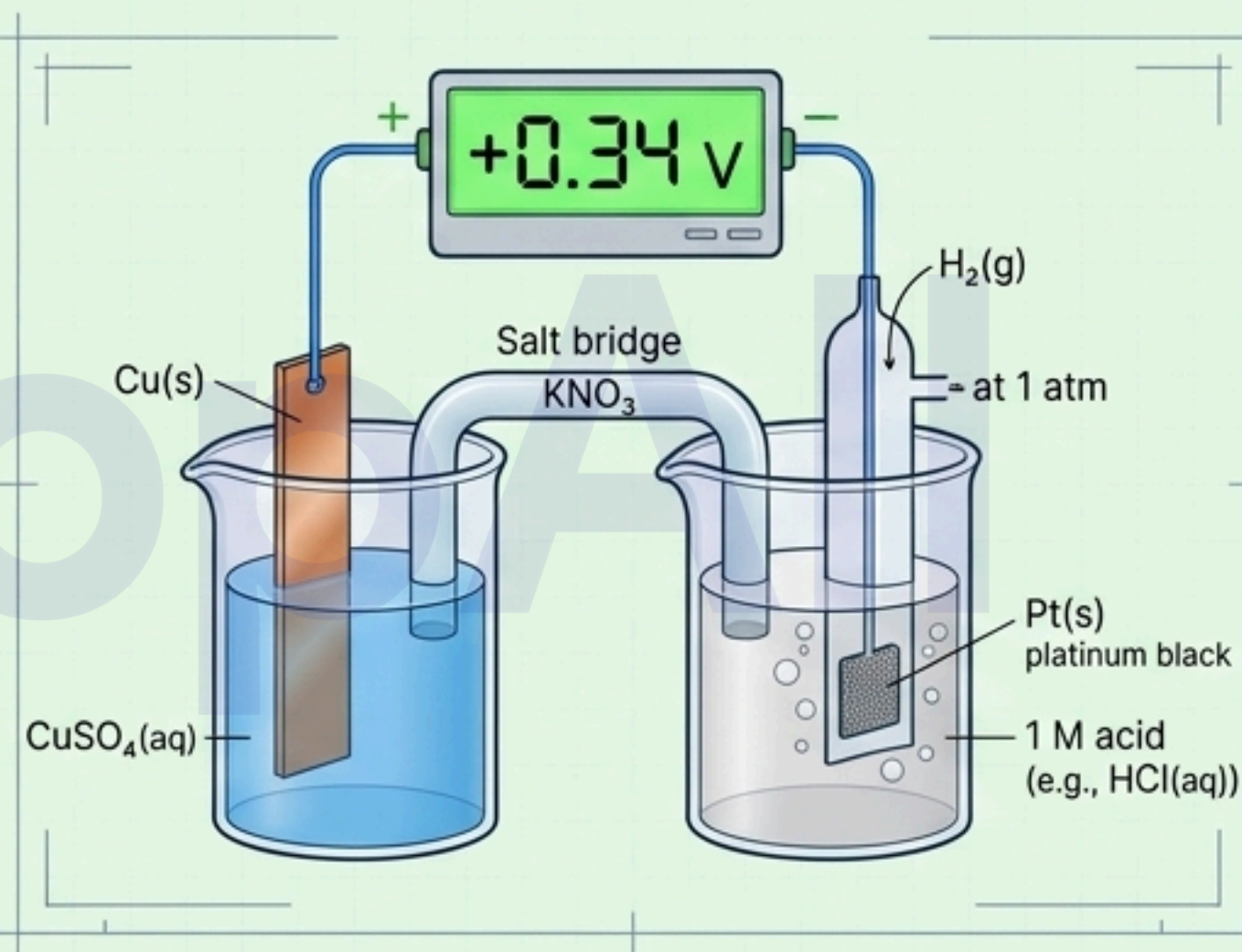
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Individual Half-Cell Potential Cannot Be Measured Absolutely

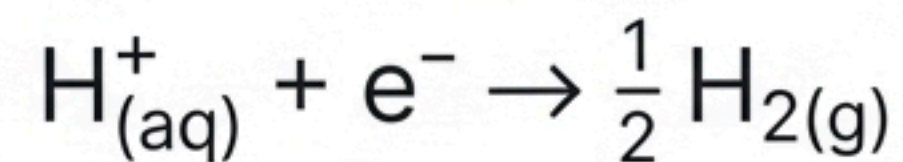
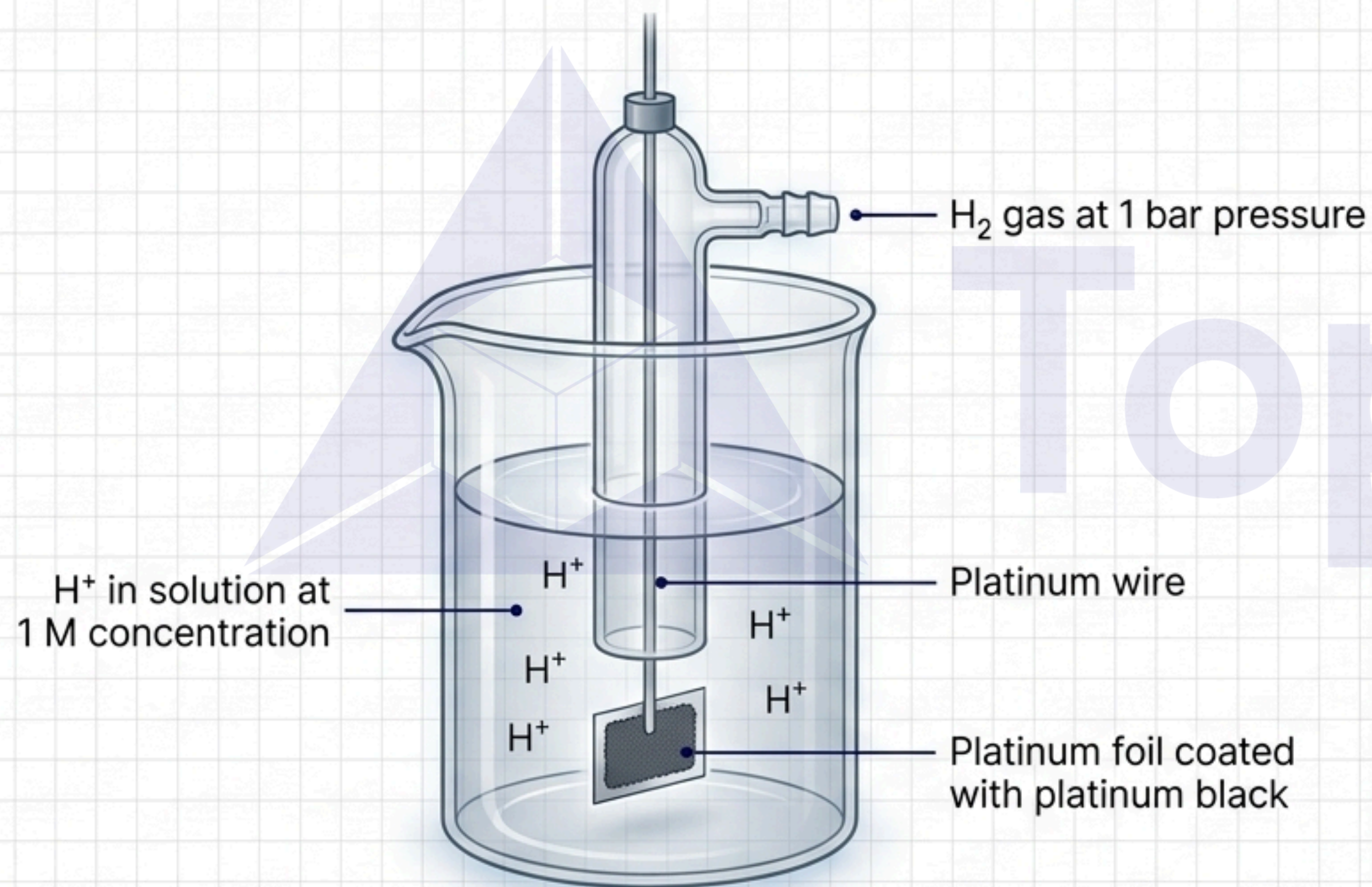


A single half-cell cannot complete a circuit.



We can only measure the difference against a reference.

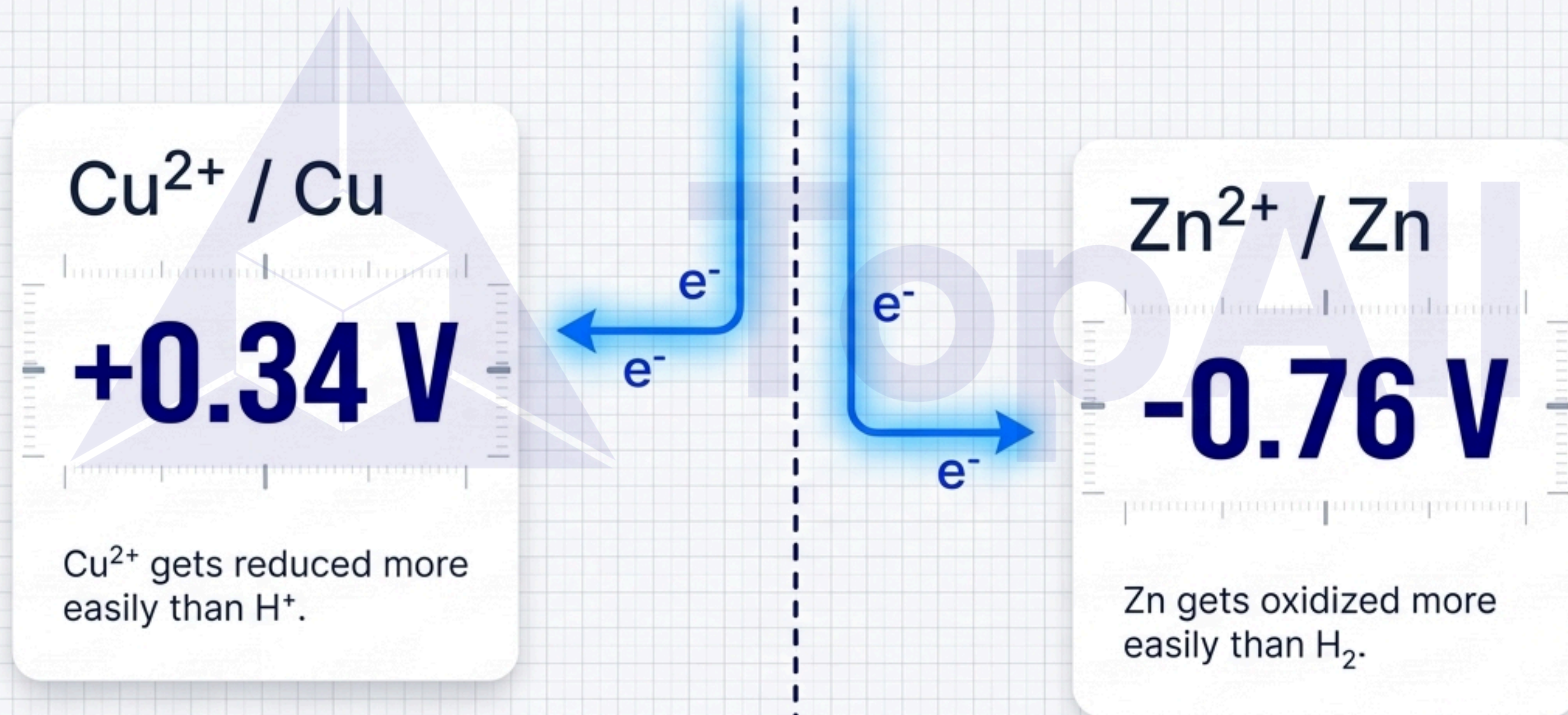
The Standard Hydrogen Electrode (SHE)



$$E^\circ_{\text{SHE}} = 0.00 \text{ V}$$

(Assigned at all temperatures)

Calibrating Metals Against SHE



Building the Daniell Cell

$$E_{\text{cell}}^{\circ} = E_{\text{cathode}}^{\circ} - E_{\text{anode}}^{\circ}$$

$$E_{\text{cell}}^{\circ} = 0.34 - (-0.76)$$

$$E_{\text{cell}}^{\circ} = 1.10 \text{ V}$$

⚠ JEE TRAP

Do NOT multiply standard electrode potentials (E°) by stoichiometric coefficients when balancing electrons. It is an intensive property!

Final Revision

$$E^{\circ}_{\text{cell}} = E^{\circ}_{\text{cathode}} - E^{\circ}_{\text{anode}}$$

- ✓ **SHE Baseline:** Arbitrarily assigned exactly 0.00 V at all temperatures.
- ✓ **IUPAC Standard:** All accepted values are Standard Reduction Potentials.
- ✓ **Intensive Property:** E° depends on the nature of the material, never the quantity.



You've Learned the Theory.

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