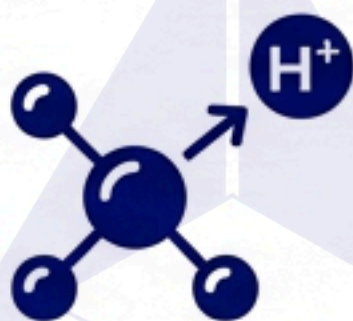


Redox Titration: Colour Reveals the End Point

Tracking invisible electron transfers
through visible chemical signals.



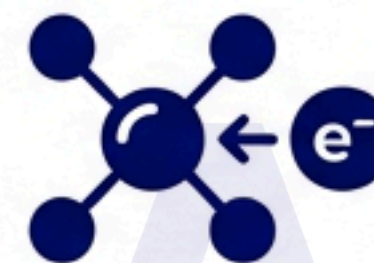
Two Currencies, One Goal: Finding the Perfect Balance



Type: **Acid-Base Titration**

Currency: Proton (H^+) Transfer

Signal: Monitored by a pH-sensitive indicator.



Type: **Redox Titration**

Currency: Electron (e^-) Transfer

Signal: Monitored by a redox-sensitive indicator.

The Auto-Signal: Permanganate (MnO_4^-)

No external indicator needed. MnO_4^- acts as a **self-indicator**.

+7 (Purple)

+2 (Colorless)



The first lasting tinge of pink appears at a concentration of just 10^{-6} mol/L, ensuring minimal overshoot.



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$$E=mc^2$$



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The Assisted Signal: Dichromate & Diphenylamine



The Problem:

Dichromate ($\text{Cr}_2\text{O}_7^{2-}$) is not a self-indicator.
The equivalence point occurs without a dramatic visual change.



The Solution:

Enter **Diphenylamine**. This external indicator sits in wait and is oxidized immediately after the last bit of reactant is consumed.

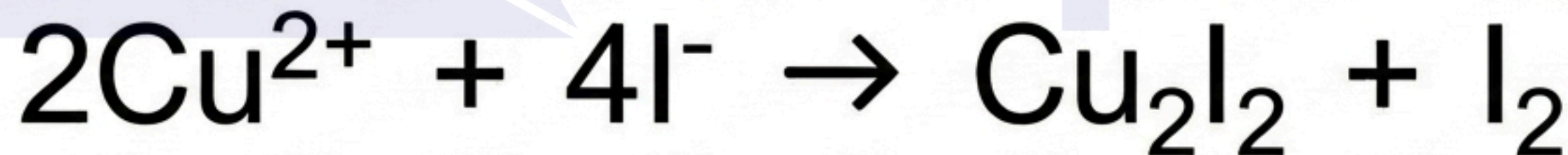
Produces an **INTENSE BLUE** endpoint.

Indirect Tracking: Iodometric Titration (Part 1)

Some oxidants, like Cu(II), are tracked indirectly by their ability to oxidize **iodide (I⁻)** into free **iodine (I₂)**.

Reduction: $\text{Cu}^{2+} (+2) \rightarrow \text{Cu}^+ (+1)$

Oxidation: $\text{I}^- (-1) \rightarrow \text{I}_2 (0)$



Context Note: Liberated I₂ stays in solution (with KI) as KI₃.



The Disappearing Signal: Thiosulphate (Part 2)



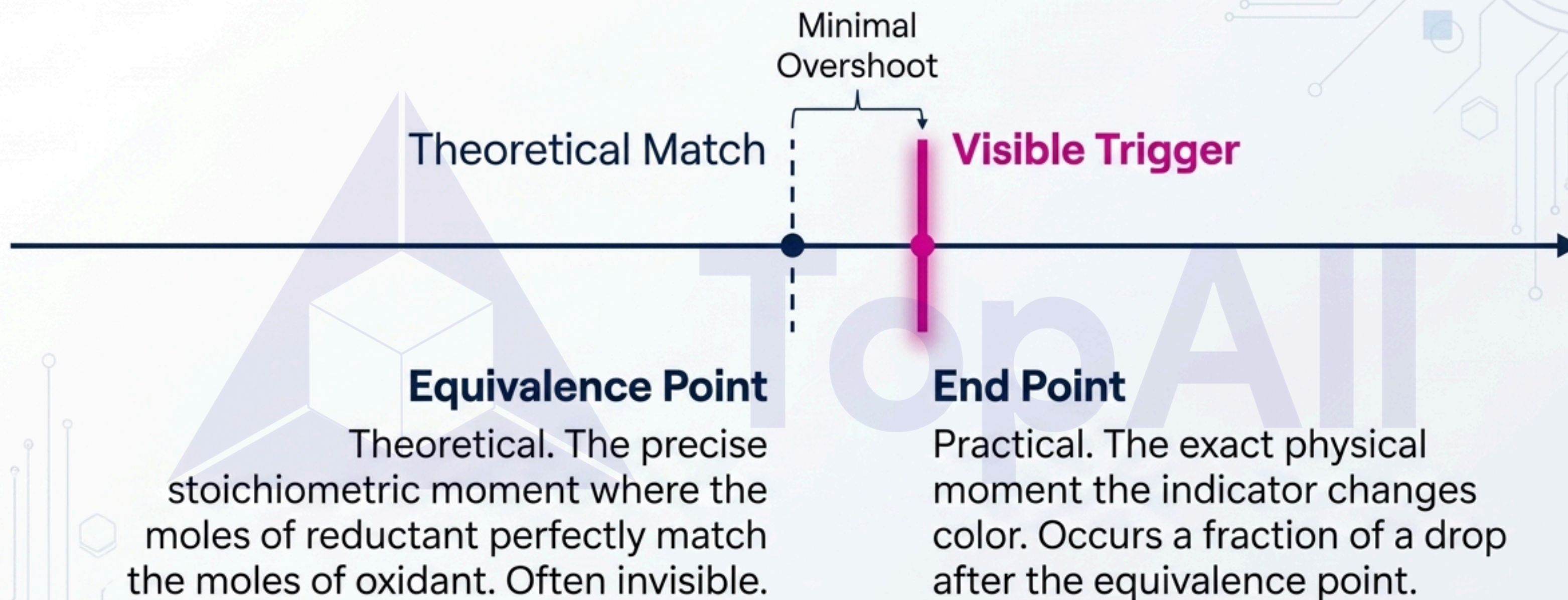
1. Starch is added, binding to I_2 to create an intense blue color.
2. Thiosulphate ($\text{S}_2\text{O}_3^{2-}$) is titrated to consume the I_2 .

Color Contrast Panel



The end-point is the exact moment the blue color vanishes.

The Final Drop: Equivalence vs. End Point



A perfectly designed redox titration utilizes an indicator that triggers as close to the equivalence point as possible, turning atomic completion into visible color.



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