

Potassium Dichromate



The Premier Inorganic
Oxidizing Agent.

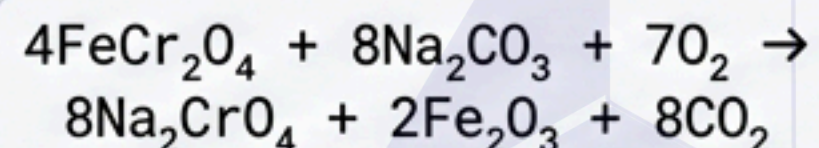


State: Vivid Orange
Solid | Principal Use:
Volumetric Analysis &
Synthesis

Genesis: 3-Step Industrial Synthesis

Step 1: Fusion

Roasting chromite ore with alkali in air.

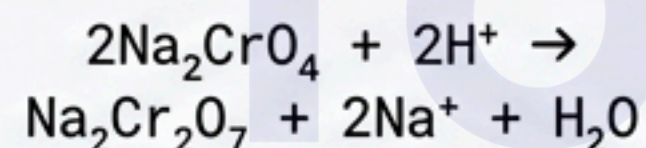


[Yellow Sodium Chromate]



Step 2: Acidification

Treating the yellow extract with sulfuric acid.

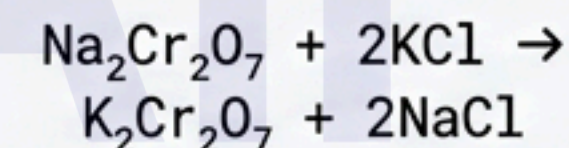


[Orange Sodium Dichromate]



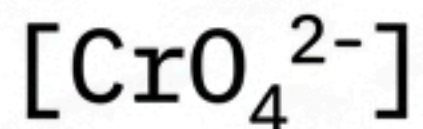
Step 3: Conversion

Cation exchange exploiting solubility.



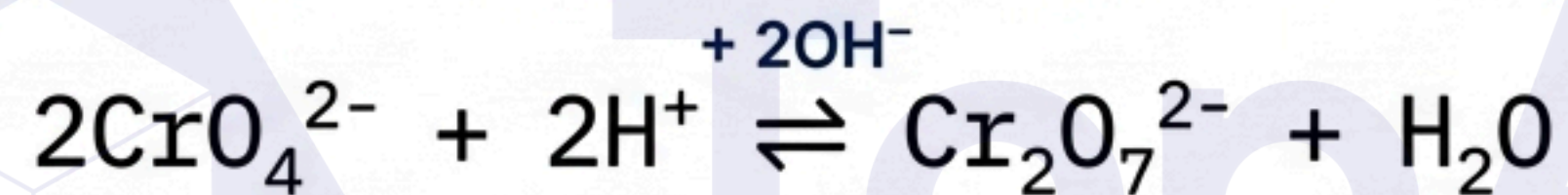
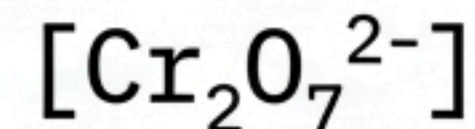
Why add KCl? Sodium dichromate is highly soluble; Potassium dichromate crystallizes out easily.

The Shape-Shifter: pH-Dependent Equilibrium



Chromate Ion

Dichromate Ion



Promoted by
adding $[\text{OH}^-]$
(Basic medium)

Promoted by
adding $[\text{H}^+]$
(Acidic medium)

Beware! The oxidation state of Chromium remains exactly +6 in BOTH forms. It is a structural shift, not a redox reaction.



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

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



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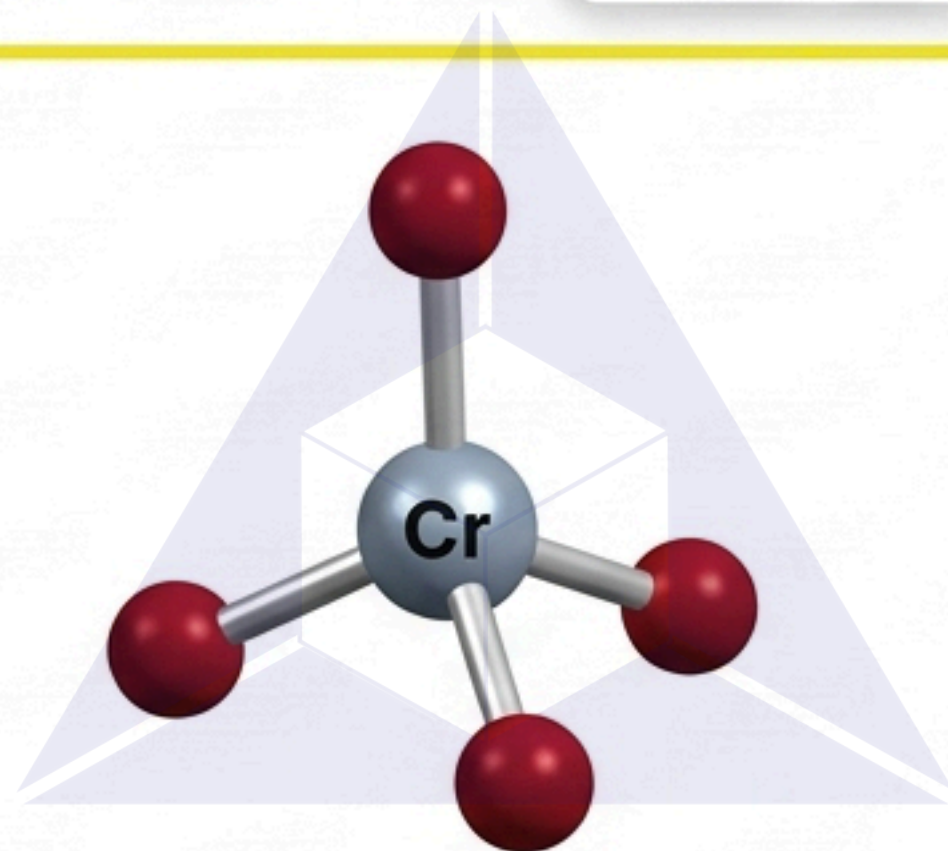
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



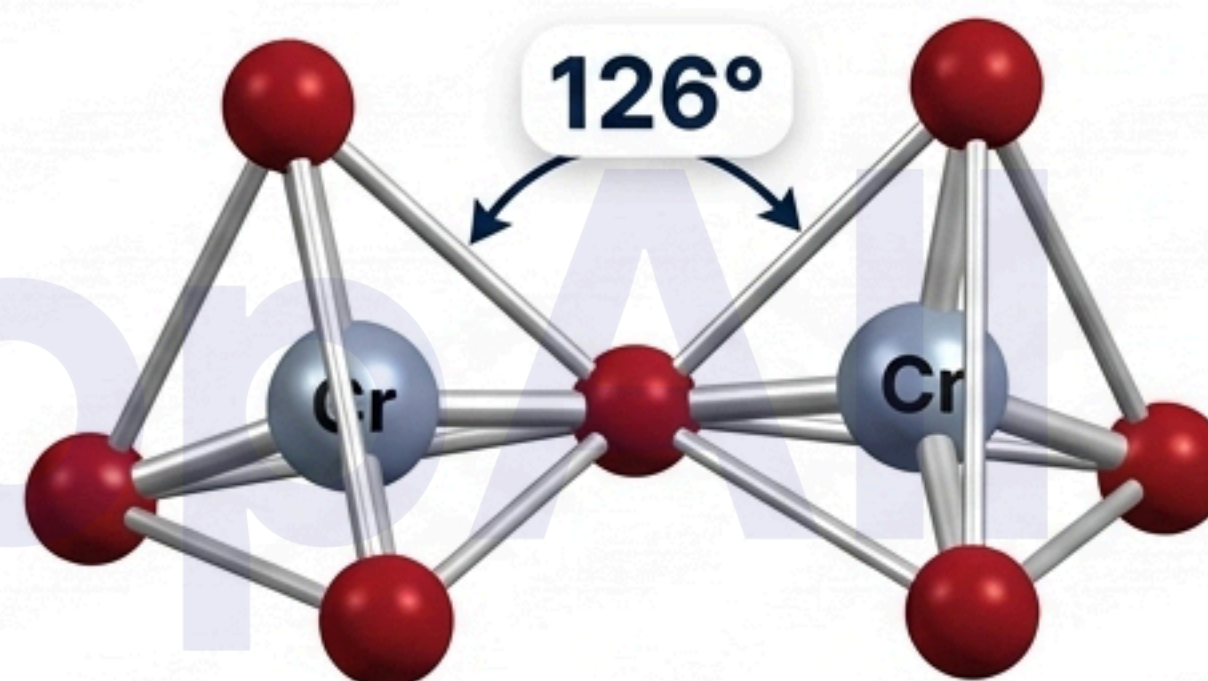
Structural Anatomy of the Ions

Chromate Ion $[\text{CrO}_4^{2-}]$



- **Geometry:** Tetrahedral.
- **Color:** Yellow.

Dichromate Ion $[\text{Cr}_2\text{O}_7^{2-}]$

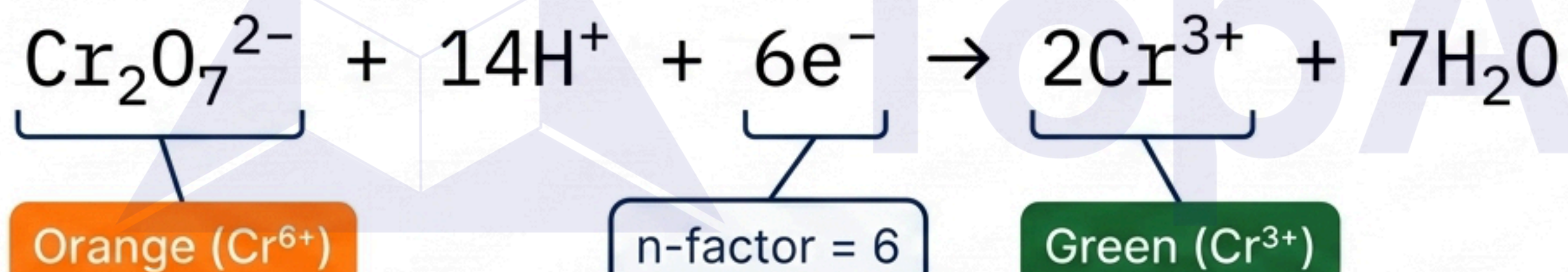


- **Geometry:** Two corner-sharing tetrahedra.
- **Color:** Orange.

Bonding involves $p\pi-d\pi$ overlap between the oxygen p-orbitals and chromium d-orbitals.

The Engine: Oxidizing Power in Acid

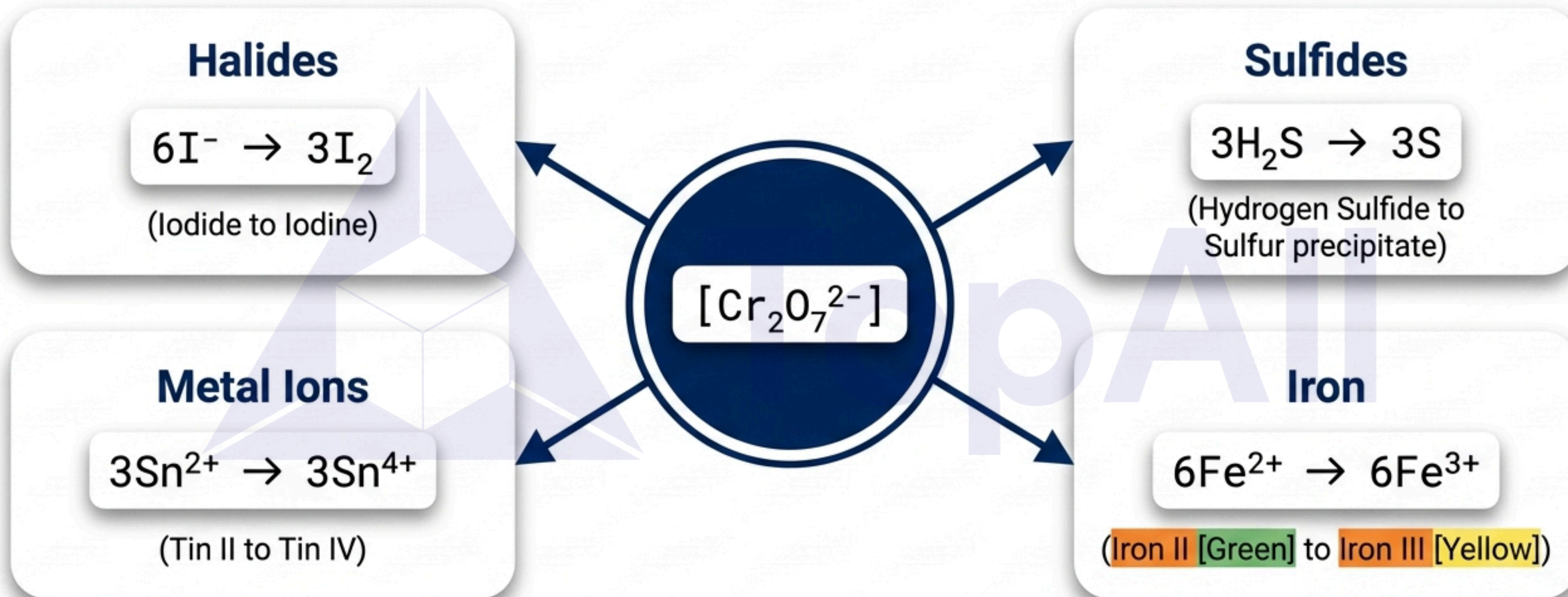
Equation HUD



Standard Potential:
 $E^\circ = +1.33\text{V}$

Requirement:
Operates exclusively in strongly acidic media.

Reaction Hub: Primary Oxidation Targets



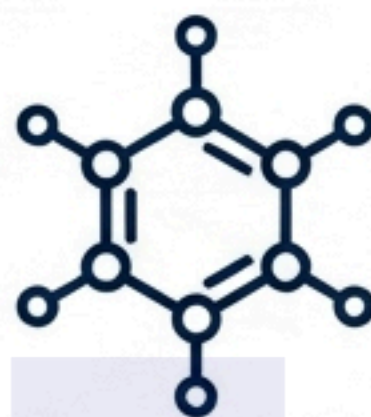
In all cases, the Dichromate itself is reduced to the green $[\text{Cr}^{3+}]$ ion.

Applications & Industrial Utility



Primary Standard

Used extensively in volumetric analysis. Unlike KMnO_4 , it is stable, non-hygroscopic, and its aqueous solutions do not decompose easily.



Powerful Oxidant

Used heavily in organic chemistry, notably for the preparation of azo compounds and oxidation of alcohols/aldehydes.



Chrome Tanning

The leather industry relies on chromium compounds to stabilize hides and create durable leather goods.

NEET / JEE Mastery: High-Yield Traps

The Equivalent Weight Trick

Because the half-reaction involves 6 electrons, the n-factor is 6.

$$\text{Eq. Weight} = \text{Molar Mass} / 6$$

The Angle Anomaly

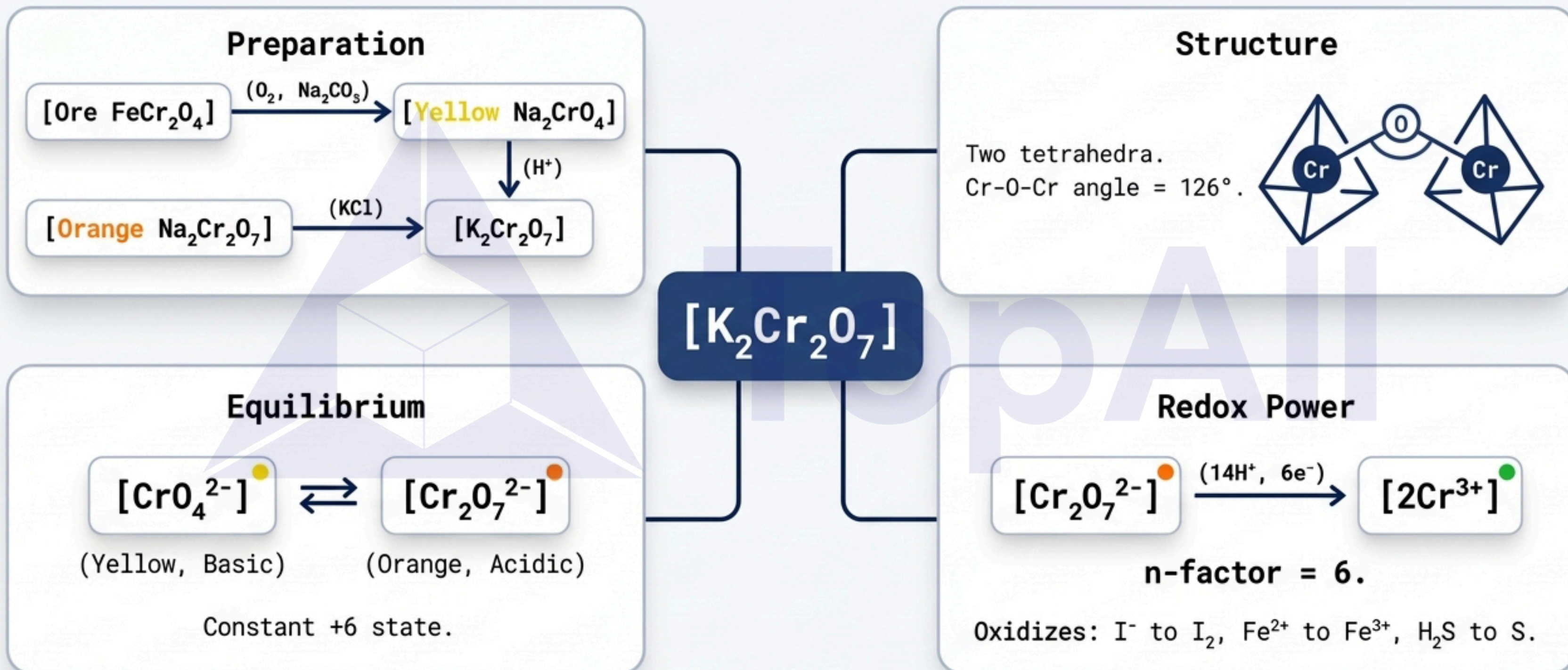
The Cr-O-Cr bridge in the dichromate ion is NOT linear. It is bent at exactly 126° .

The pH Trap

Adding $[\text{OH}^-]$ to an orange Dichromate solution turns it yellow.
Adding $[\text{H}^+]$ turns it back.

Chromium's oxidation state (+6)
NEVER changes during this color shift.

The $\text{K}_2\text{Cr}_2\text{O}_7$ Blueprint (Quick Revision)





You've Learned the Theory.

Now Let's Test It.

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