

Potassium Dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$)

Preparation, Structure, and
Oxidising Properties.

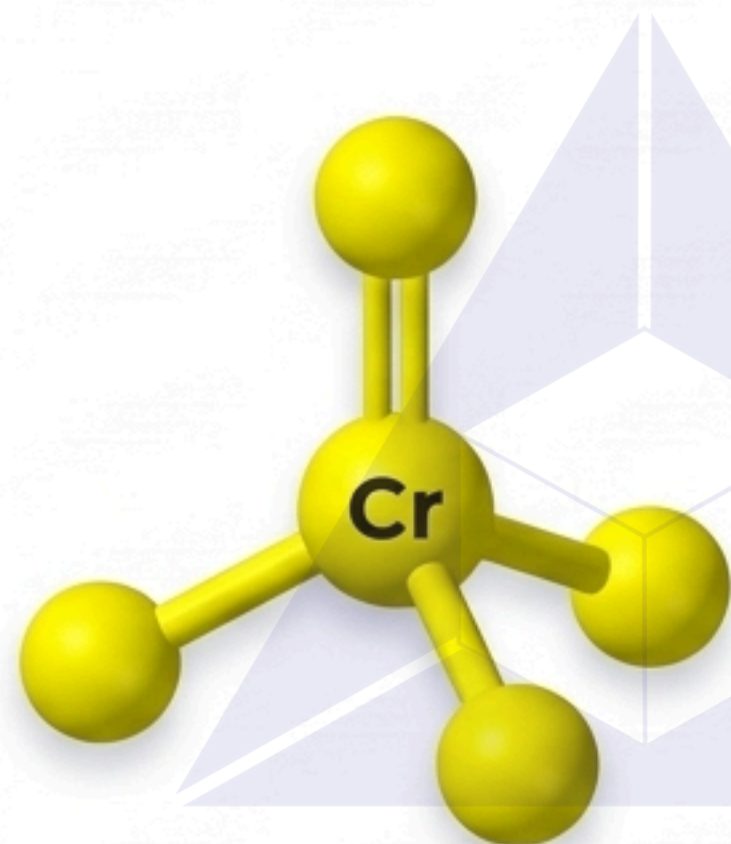
Chromate vs. Dichromate

The primary Cr(VI) oxoanions.
Chromate (CrO_4^{2-}) is yellow;
Dichromate ($\text{Cr}_2\text{O}_7^{2-}$) is orange.

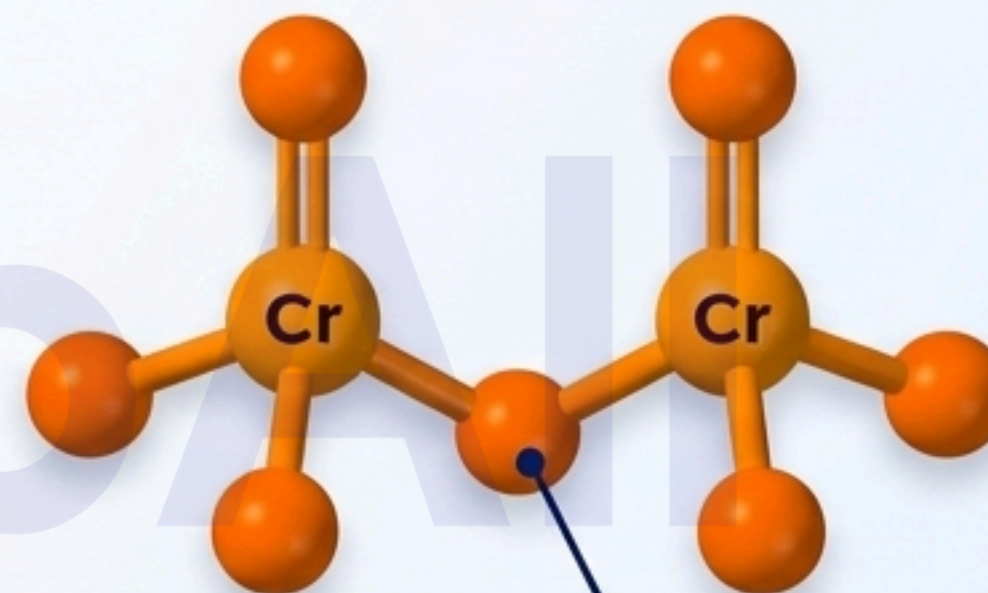
pH Interconversion

The dynamic equilibrium where
adding acid or base shifts the ion's
form and color without changing its
oxidation state.

Structural Interconversion



Chromate
(Tetrahedral)

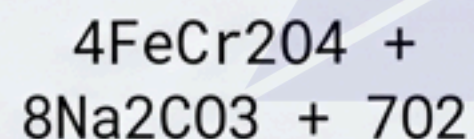


126° Cr-O-Cr angle

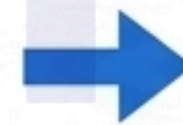
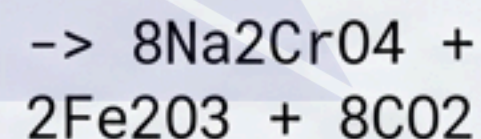
Dichromate
(Corner-sharing)

Paragraph-to-Process: Industrial Preparation

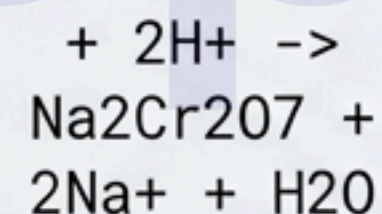
Chromite Ore



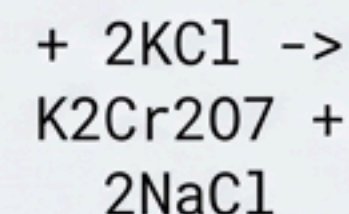
Sodium Chromate (Yellow)



Sodium Dichromate (Orange)



Potassium Dichromate





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

$$E=mc^2$$



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Practice Now



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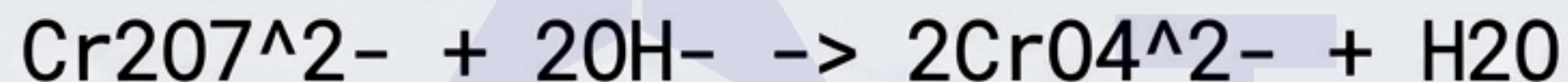
Key Highlights

- » 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



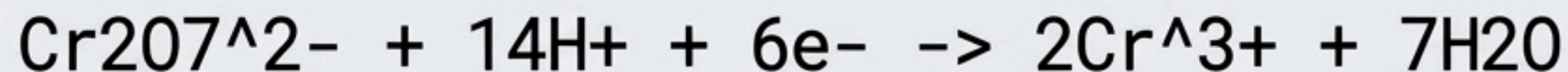
Formula Bank

// pH-dependent equilibrium



$$E^\circ = 1.33\text{V}$$

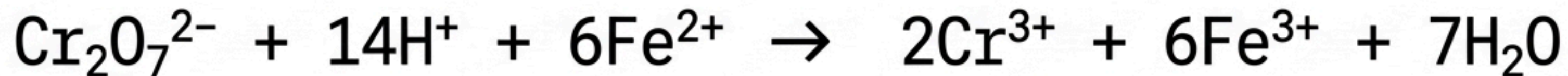
// Standard oxidising action in acidic solution



Worked Example: Balancing Redox



× 6



Diagnostic Pivot

Watch for this: The Interconversion Trap

Chromium's oxidation state stays exactly +6 in BOTH chromate and dichromate. The **shift in color (yellow <-> orange)** is purely a structural response to pH, **NOT** a redox reaction.

Visual Proof

CrO₄²⁻ Calculation:

$$x + 4(-2) = -2$$

$$x = +6$$

Cr₂O₇²⁻ Calculation:

$$2x + 7(-2) = -2$$

$$2x = 12 \rightarrow x = +6$$

Practice Check

In the structure of the dichromate ion ($\text{Cr}_2\text{O}_7^{2-}$), what is the specific Cr-O-Cr bond angle, and what happens to the **oxidation state of Chromium** when converted from **Chromate**?

A) 109.5° , increases to +7

B) 126° , remains +6 

C) 126° , decreases to +3

D) 180° , remains +6

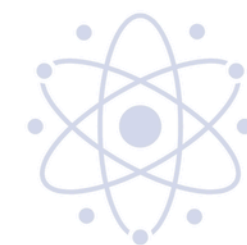
Key Takeaways

- **Prep Sequence:** $\text{K}_2\text{Cr}_2\text{O}_7$ is synthesized from Chromite ore (FeCr_2O_4) via a sequential transformation through sodium chromate and sodium dichromate, finalized by displacement with KCl.
- **Oxidising Power:** In acidic media, $\text{K}_2\text{Cr}_2\text{O}_7$ acts as a powerful oxidant ($E^\circ = 1.33\text{V}$), reducing itself to Cr^{3+} by accepting 6 electrons per molecule.



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