

WJEC (Wales) Chemistry A-level

Topic 3.2 - Redox Reactions

Flashcards

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What is an oxidising agent?



What is an oxidising agent?

The oxidising agent gains electrons from the species being oxidised.

The oxidising agent itself is reduced.



What is a reducing agent?



What is a reducing agent?

The reducing agent donates electrons to the species being reduced.

The reducing agent itself is oxidised.



What is a half equation?



What is a half equation?

An equation that tells you what is happening at one of the electrodes during an electrochemical reaction.



Construct the half equation for the reduction of $\text{Cr}_2\text{O}_7^{2-}$ ions to Cr^{3+} ions



Construct the half equation for the reduction of $\text{Cr}_2\text{O}_7^{2-}$ ions to Cr^{3+} ions



Construct the half equation for the
reduction of MnO_4^- to Mn^{2+} ions



Construct the half equation for the reduction of MnO_4^- to Mn^{2+} ions



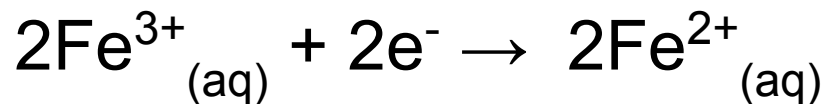
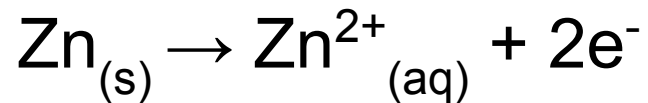
Construct the half equation for the
oxidation of $\text{S}_2\text{O}_3^{2-}$ to $\text{S}_4\text{O}_6^{2-}$ ions



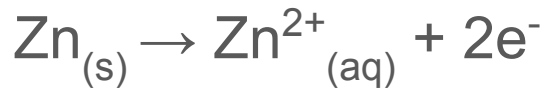
Construct the half equation for the oxidation of $\text{S}_2\text{O}_3^{2-}$ to $\text{S}_4\text{O}_6^{2-}$ ions



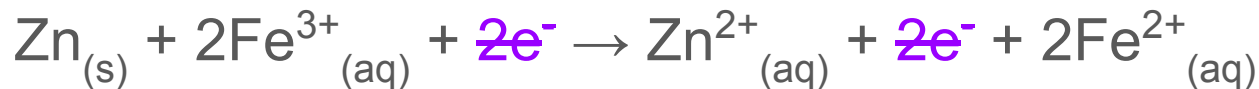
How do you combine two balanced half equations?



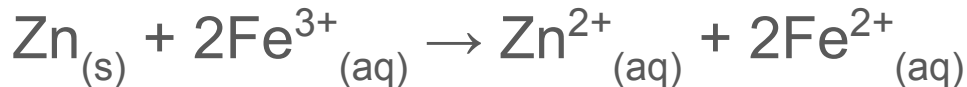
How do you combine two balanced half equations?



Combine the equations into one and cancel any common species that appear on both sides of the equation:



Overall redox equation:



What is a redox titration?



What is a redox titration?

A titration of a reducing agent by an oxidising agent (or vice versa).



What equipment is required to carry out a titration?



What equipment is required to carry out a titration?

- Burette
- Pipette and pipette filler
- Conical flask
- Funnel
- White tile
- Clamp and stand



How do you carry out a titration?



How do you carry out a titration?

- Once the pipette has been used to measure one reactant into the conical flask, fill the burette with the other reactant. Record the burette initial volume.
- Add a few drops of indicator to the conical flask.
- Open the burette tap and allow the reactant to flow into the conical flask, swirling it to mix the contents.
- Close the burette tap once the colour change occurs.
- Record final burette volume.
- Repeat until you get concordant results, then calculate a mean titre.



What is the ionic equation for the reaction between acidified Fe^{2+} and potassium manganate(VII)?



What is the ionic equation for the reaction between acidified Fe^{2+} and potassium manganate(VII)?



Describe the procedure of titrating potassium manganate(VII) with Fe^{2+} ions in an unknown solution



Describe the procedure of titrating potassium manganate(VII) with Fe^{2+} ions in an unknown solution

- Add the potassium manganate(VII) solution into the burette.
- The unknown solution containing Fe^{2+} ions is acidified with dilute H_2SO_4 and measured into a conical flask.
- Record the initial volume in the burette.
- Add the potassium manganate(VII) solution slowly into the flask. As it reacts, it decolourises. When there is the first trace of a permanent pale pink solution, close the burette tap.
- Record the final volume of the burette.



What is potassium manganate(VII)?



What is potassium manganate(VII)?

Strong oxidising agent



Explain what happens during the redox reaction between Cu^{2+} ions and I^- ions



Explain what happens during the redox reaction between Cu^{2+} ions and I^- ions

In this reaction, I^- isn't a strong enough reducing agent to completely reduce the Cu^{2+} ions, so they are only reduced to Cu^+ ions.



Give the chemical equation for the reaction between Cu^{2+} ions and I^- ions



Give the chemical equation for the reaction between Cu^{2+} ions and I^- ions



What happens when iodine is titrated
with thiosulfate ions?



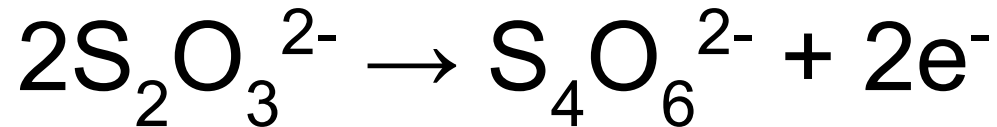
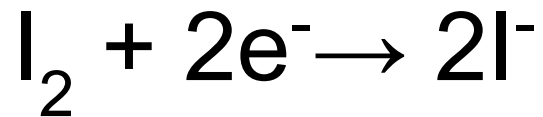
What happens when iodine is titrated with thiosulfate ions?

Iodine is reduced by the thiosulfate reducing agent.

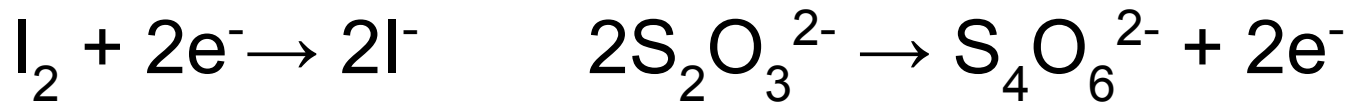
The thiosulfate ions are oxidised by the iodine oxidising agent.



What is the chemical equation for the redox reaction that takes place between iodine and thiosulfate ions?



What is the chemical equation for the redox reaction that takes place between iodine and thiosulfate ions?



Cancel out the electrons and combine the two half equations:

