INKCHEMISTRY FLASHCARDS

# Redox

Unit C07 · 29 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions to learn and misconceptions to correct. These cards, and a check-yourself question for every lesson, run on the website with spaced-repetition scheduling, at inklearning.co.uk/chemistry/flashcards.

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DEFINITION

Define: Oxidation.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Reduction.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Redox reaction.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Oxidation state.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Oxidation number.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Peroxide.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Metal hydride.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Oxidising agent.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

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DEFINITION

The gain of electrons by a species, which lowers the oxidation state of one of its elements.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

The loss of electrons by a species, which raises the oxidation state of one of its elements.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

The charge an atom would have if all its bonds were ionic, with the bonding electrons assigned to the more electronegative atom.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

A reaction in which one species is oxidised and another is reduced, with electrons transferred from one to the other.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

A compound containing an O–O single bond, such as $H_2O_2$ or $Na_2O_2$, in which each oxygen has an oxidation state of -1.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Another name for oxidation state: the same number, found by the same rules.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

An electron acceptor: a species that oxidises another and is itself reduced.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

A compound of a metal with hydrogen, such as NaH or $CaH_2$, containing $H^-$ ions, in which hydrogen has an oxidation state of -1.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

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DEFINITION

Define: Reducing agent.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

SPOT THE ERROR

Say what is wrong with this claim:

Oxidation means adding oxygen, so a reaction with no oxygen in it cannot be a redox reaction.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

DEFINITION

Define: Half-equation.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Spectator ion.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Ionic equation.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Disproportionation.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Chloric(I) acid.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Chlorate(I) ion.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

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**SPOT THE ERROR**

Oxidation is loss of electrons, shown by a rise in oxidation state, and it needs no oxygen. When sodium burns in chlorine, sodium goes from 0 to +1 and is oxidised; chlorine goes from 0 to -1 and is reduced. Oxygen is one oxidising agent among many, and any reaction in which oxidation states change is redox.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

**DEFINITION**

An electron donor: a species that reduces another and is itself oxidised.

OXIDATION STATES AND THE RULES FOR ASSIGNING THEM

**DEFINITION**

An ion present in the reaction mixture that is unchanged by the reaction and is left out of the ionic equation.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

**DEFINITION**

An equation for either the oxidation or the reduction part of a redox reaction, balanced for atoms and charge, with electrons shown.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

**DEFINITION**

A redox reaction in which the same element in one species is simultaneously oxidised and reduced.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

**DEFINITION**

An equation showing only the species that take part in the reaction, with spectator ions left out, balanced for atoms and charge.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

**DEFINITION**

The $ClO^-$ ion, in which chlorine has an oxidation state of +1; its sodium salt is the active ingredient of bleach.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

**DEFINITION**

HClO, the weak acid formed when chlorine reacts with water, in which chlorine has an oxidation state of +1.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

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DEFINITION

Define: Overall redox equation.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Chlorate(V) ion.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

SPOT THE ERROR

Say what is wrong with this claim:

Balancing a redox equation just means getting the same atoms on both sides, and the charges look after themselves.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

Define: Redox titration.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: Self-indicating.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: End point.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: Autocatalysis.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: Titre.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

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DEFINITION

The $ClO_3^-$ ion, in which chlorine has an oxidation state of +5; formed with chloride when chlorine reacts with hot, concentrated alkali.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

The equation formed by adding an oxidation half-equation and a reduction half-equation with equal numbers of electrons, so that the electrons cancel.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

A titration in which the reaction between the solution in the burette and the solution in the flask is a redox reaction.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

SPOT THE ERROR

Charge balances separately, and it is the electrons that balance it. Each half-equation is balanced for atoms with $H_2O$ and $H^+$, then for charge by adding electrons; the two halves are scaled so the electrons given equal those taken, and then added. In $2MnO_4^- + 6H^+ + 5H_2O_2 \rightarrow 2Mn^{2+} + 5O_2 + 8H_2O$ each side carries +4.

HALF-EQUATIONS AND BUILDING REDOX EQUATIONS

DEFINITION

The point in a titration at which the indicator, or the reagent itself, first shows a permanent colour change.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Describes a titration in which a reagent's own colour change shows the end point, so no separate indicator is added.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

The volume of solution added from the burette to reach the end point.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Catalysis of a reaction by one of its own products, so the rate increases as the product builds up.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

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DEFINITION

Define: Concordant titres.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: Primary standard.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: Standard solution.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Define: Percentage purity.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

SPOT THE ERROR

Say what is wrong with this claim:

Any acid will do to acidify a manganate(VII) titration, so the hydrochloric acid on the side bench is fine.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

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DEFINITION

A substance pure and stable enough that a solution of accurately known concentration can be made by weighing it and dissolving it to a known volume.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

Titres that agree with one another to within 0.10 $cm^3$, which are the ones used to calculate the mean.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

The mass of the pure substance in a sample, as found by analysis, divided by the mass of the sample, multiplied by 100.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

DEFINITION

A solution whose concentration is known accurately, used to find the concentration of another.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

SPOT THE ERROR

Use dilute sulfuric acid. Manganate(VII) is a strong enough oxidising agent to oxidise chloride ions to chlorine, so with hydrochloric acid some of the manganate is used up by the acid itself and the titre is too large. Nitric acid is an oxidising agent and would react with the iron(II). Sulfate ions do neither.

REDOX TITRATIONS: MANGANATE(VII) AND THIOSULFATE

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