

Oxidation & Reduction Reactions Redox

This is LEO



He says GER

Redox Reactions

- A reaction in which electrons are transferred from one atom to another is called an _____.
- For simplicity, chemists often refer to oxidation–reduction reactions as _____.

Determining Oxidation Numbers

1. The oxidation number for any uncombined elements or diatomic molecule is _____

- For example:
- C
- O₂
- S
- Cl₂

Determining Oxidation Numbers

2. The oxidation number for a monatomic ion is its _____

- For example:
- Ca⁺²
- Br⁻¹
- MgBr₂ = Mg = Br =

Determining Oxidation Numbers

3. The oxidation number of Hydrogen is usually _____. The exception is in a metal hydride where the oxidation number will be _____

- For example:
- $\text{HCl} \rightarrow \text{H} =$
- $\text{H}_2\text{SO}_4 \rightarrow \text{H} =$
- $\text{NaH} \rightarrow \text{H} =$

Determining Oxidation Numbers

4. The oxidation number of oxygen is usually _____ EXCEPT in _____ . Then it is _____

- For example:
- $\text{MgO} \rightarrow \text{O} =$
- $\text{KClO}_3 \rightarrow \text{O} =$
- $\text{H}_2\text{O}_2 \rightarrow \text{O} =$

Determining Oxidation Numbers

5. In binary compounds (nonmetal + nonmetal) the positive one is first and the negative one is second

- For example:
- $\text{PCl}_3 \rightarrow \text{P} = \quad \text{Cl} =$
- $\text{CO}_2 \rightarrow \text{O} = \quad \text{C} =$

Determining Oxidation Numbers

6. The sum of the oxidation numbers for all atoms in a neutral compound is _____

- For example:
 H_2O

Determining Oxidation Numbers

7. The sum of the oxidation numbers in a polyatomic ion is equal to the _____ of the polyatomic ion
- For example:
 - HCO_3^{-1}

Oxidation Numbers

- Determine the oxidation numbers of all species in the following examples:
- H_2
- CaCl_2
- KClO_4

Redox Reactions

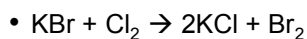
- **Oxidation reduction reactions (redox reactions)** – electrons from one atom are _____ to another atom
- _____ – loss of electrons
- _____ – gaining of electrons
- LEO says GER
- Oxidation cannot occur without reduction & vice versa

Redox Reactions

- _____ – substance that oxidized another substance by gaining its electrons (this is substance that is reduced)
- _____ – substance that reduced another substance by losing its electrons (this is the substance that is oxidized)

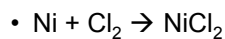
Identifying Components of a Redox Reactions

- Identify the oxidation numbers of all species, what is oxidized, reduced, the oxidizing agent, and the reducing agent in the following reaction:



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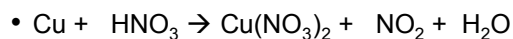
Balancing Redox Reactions (Oxidation Number Method)

Steps for Balancing Redox Reactions using the Oxidation Number Method

1. Assign oxidation numbers for all atoms
2. Identify what is oxidized, reduced, oxidizing agent, reducing agent, and the number of electrons gained and lost
3. Make the change electrons equal by placing a coefficient in front of the number of electrons gained and lost
4. Move the coefficients down and complete balancing by conventional methods

Example

- Balance the following equation using the oxidation number method



Now finish by conventional methods
This just gives you a starting place

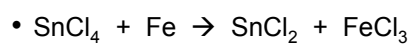
Another Example

- Balance the following equation using the oxidation number method



Try this one...

- Balance the following equation using the oxidation number method



One More...

- Balance the following equation using the oxidation number method

