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BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI - 110034

SUBJECT: CHEMISTRY

<u>CLASS 10</u>

CHAPTER 1: CHEMICAL REACTIONS AND EQUATIONS

<u>Guidelines</u>

Dear Students

- Refer to the content below, view the links, and attempt the assignment provided at the end in your chemistry notebook.
- It would help you to read the NCERT before you begin to answer the questions.
- Link of the chapter is as follows: http://ncert.nic.in/textbook/textbook.htm?jesc1=1-16

SUB TOPICS:

- 1. Redox reactions
- 2. Effects of oxidation in everyday life

1. Redox Reactions

Redox reactions are those reactions in which both oxidation and reduction occur simultaneously.

Oxidation - involves the gain of oxygen or loss of hydrogen

Reduction - involves the loss of oxygen or gain of hydrogen

Oxidation	Reduction
1. Addition of oxygen	1. Removal of oxygen
2. Removal of hydrogen	2. Addition of hydrogen
3. Loss of electrons	3. Gain of electrons

Example 1: When Oxygen is involved:

 $ZnO + C \rightarrow Zn + CO$

In this reaction, zinc oxide is reduced to zinc due to loss of oxygen.

Carbon is oxidized to carbon monoxide due to gain of oxygen.

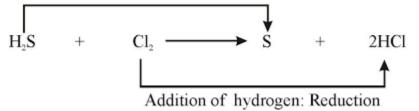
When Oxygen is NOT involved:

Oxidation is also considered as LOSS of HYDROGEN

- Reduction is also considered as GAIN of HYDROGEN
- REMEMBER they are OPPOSITE PROCESSES

Example 2:

Removal of hydrogen: Oxidation



- OXIDATION and REDUCTION always occur simultaneously
- OXIDIZED substance gains oxygen OR loses hydrogen OR loses electrons
- REDUCED substance loses oxygen OR gains hydrogen OR gains electrons
- Substance that is oxidized is the REDUCING agent
- Substance that is reduced is the OXIDIZING agent

NOTE-

In redox reactions, electrons are transferred between the reactants For Example:

Mg + S \rightarrow Mg²⁺ + S²⁻ (MgS)

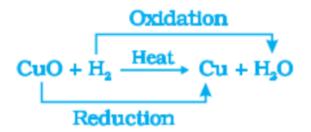
• Mg (with 0 charge) loses 2 electrons = OXIDIZED to Mg2+

• S atom (no charge) gains 2 electrons = REDUCED to S2-

Thus we say that in the above reaction Magnesium is oxidized (due to loss of electrons) while Sulphur is reduced (due to gain of electrons)

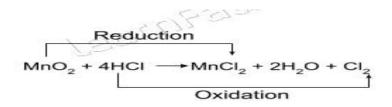
So, Magnesium is the reducing agent while Sulphur is the oxidizing agent.

LET'S CONSIDER A FEW MORE EXAMPLES Example 1



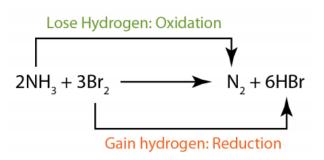
Here CuO is the Oxidizing Agent while H₂ is the reducing agent.

Example 2:



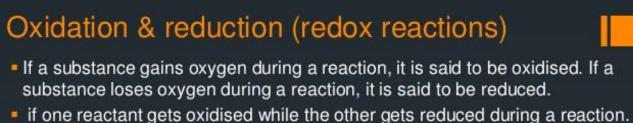
Here MnO₂ is the Oxidizing Agent while HCl is the reducing agent.

Example 3:



Now, identify the oxidizing agent as well as the reducing agent in the above reaction.

SUMMARY



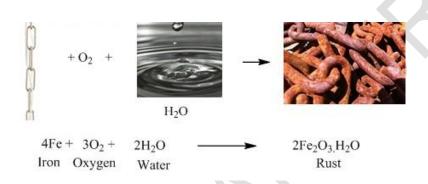
- If one reactant gets oxidised while the other gets reduced during a reaction.
 Such reactions are called oxidation-reduction reactions or redox reactions.
- if a substance gains oxygen or loses hydrogen during a reaction, it is oxidised. If a substance loses oxygen or gains hydrogen during a reaction, it is reduced.

2. Effects of Oxidation in Everyday Life

a) Corrosion

We all must have observed that newly bought iron, silver or copper articles appear very shiny but with the passage of time, they get dull. This is due to the layer of metal oxide / carbonate or sulphide that develops on their surface. Corrosion of iron is called as <u>Rusting</u>.

In case of rusting of iron, the iron reacts with the oxygen present in air and moisture and develops rust (hydrated iron (III) oxide).



Corrosion causes damage to car bodies, bridges, iron railings, ships and to all objects made of metals, especially those of iron.

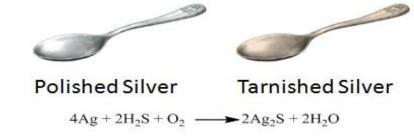
 In case of corrosion of copper, the metallic copper reacts with oxygen, carbon-dioxide and atmospheric moisture and develops a green coloured coating of copper hydroxide and copper carbonate.

Figure below shows Copper developing green coloured layer on exposure to moist air



 $2Cu + H_2O + CO_2 + O_2 \longrightarrow Cu(OH)_2 + CuCO_3$

 In case of tarnishing of silver articles, the metallic silver reacts with hydrogen sulphide or sulphur present in air and gets tarnished.



b) <u>Rancidity</u>

It is generally observed that when oily food items are kept for a long time, they start to smell very bad. This happens because the fats and oils get oxidised and hence they become rancid that changes their taste and smell.

To avoid such spoilage, antioxidants are added to oily food items. Food items can also be prevented from getting oxidised by keeping them in air tight packets.

Due to this reason packets of chips are flushed with gas such as **nitrogen** that acts as antioxidant and prevents spoilage of the fried chips.



ASSIGNMENT:

Q1.Identify the **oxidising agent** as well as the **reducing agent** in the following reactions:

(a) $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$

(b) $V_2O_5 + 5Ca \longrightarrow 2V + 5CaO$ (c) $Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$

(d) $2H_2 + O_2 \longrightarrow 2H_2O$

e) $Pb_3O_4 + 8HCI \longrightarrow 3PbCl_2 + Cl_2 + 4H_2O$

Q2.A silver article generally turns black when kept in the open for a few days.

(a) Why do silver articles turn black when kept in the open for a few days? Name the phenomenon involved.

(b) Name the black substance formed and give its chemical formula.

Q3.What is meant by rancidity? How can it be prevented?
