SAI International School
Lesson Notes
Subject - Chemistry
Ch-Chemical Reactions and Equations
Topic-Types of Chemical Reactions
(Redox Reactions)
Module - 4

Suggested Videos- https://youtu.be/L8XmgcrUHIw
https://youtu.be/CIGMaifbx-g
https://youtu.be/5rtJdjas-mY

To be done in CW Copy-

Oxidation-Reduction reactions are also known as **Redox Reactions**.

REDOX REACTIONS

OXIDATION	REDUCTION
1. Gain of Oxygen	1. Loss of Oxygen
2. Loss of Hydrogen	2. Gain of Hydrogen
3. Loss of electrons	3. Gain of electrons

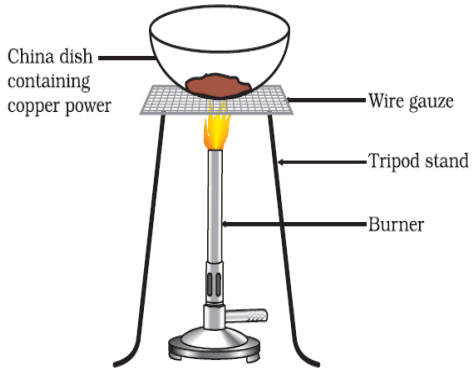
OXIDISING AGENT (OA)REDUCING AGENT (R A)

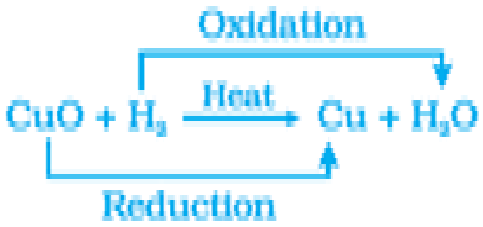
1. ***Substances undergoing Reduction.***	***Substances undergoing Oxidation.***
2. Supplier of Oxygen	Acceptor of Oxygen
3. Acceptor of Hydrogen	Supplier of Hydrogen
4. Acceptor of Electrons	Supplier of Electrons

A. Redox w.r.t GAIN/LOSS OF OXYGEN-

Examples-

a.





Oxidation Half- **Reduction Half-**

H_2 -------Gain of Oxy-------→ H_2OCuO ----loss of Oxy.-----→ CuO.A- CuO (supplier of Oxy) R.A- H_2 (Acceptor of Oxy)

b. ZnO + C→ Zn + CO

Oxidation Half- **Reduction Half-**

C -------Gain of Oxy------→ CO ZnO ----loss of Oxy.---→ Zn O.A- ZnO (supplier of Oxy) R.A- C (Acceptor of Oxy)

c. MnO_2 + 4HCl → $MnCl_2$ + $2H_2O$ + Cl_2

Oxidation Half- **Reduction Half-**

HCl --gain of Oxygen --□ H2O MnO_2 –loss of Oxygen.--> $MnCl_2$ O.A- MnO2 (Supplier of Oxygen) R.A- HCl (Acceptor of Oxygen)

B. <u>Redox w.r.t GAIN/LOSS OF HYDROGEN-</u>

d. HBr + Cl_2→ HCl + Br_2

Oxidation Half- **Reduction Half-**

HBr -------Loss of Hydrogen---→ Br_2Cl_2 --Gain of Hydrogen.→HCl O.A- Cl_2 (Acceptor of Hydrogen)R.A- HBr(Supplier of Hydrogen)

C. <u>Redox w.r.t GAIN/LOSS OF ELECTRONS-</u>

e. Fe + $Cu(SO_4)_2$→ $Fe(SO_4)_2$ + Cu(s) [Fe>Cu]
Blue sol. Pale green sol.

Oxidation Half- **Reduction Half-**

Fe ---loss of electron→Fe^{2+}Cu2+ –Gain of electrons.→CuO.A- Cu^{2+} (Accepter of electrons) R.A- Fe (Supplier of electrons)

f. Cu + $2AgNO_3$→ 2Ag(s) + $Cu(NO_3)_2$ [Cu>Ag]
colourless sol blue sol.

Oxidation Half- **Reduction Half-**

Cu ---loss of electro→$Cu^{2+}Ag^{+}$ –Gain of electrons.→AgO.A- Ag+ (Accepter of electrons) R.A- Cu (Supplier of electrons)

Assessment

MCQs

Q.1 A substance which oxidises itself and reduces other is known as -

(a) oxidising agent (b) reducing agent

(c) both of these (d) none of these

Q.2 A redox reaction is one in which-

(a) both the substance are reduced

(b) both the substance are oxidised

(c) an acid is neutralised by the base

(d) one substance is oxidised while the other is reduced

Q.3 When the gases sulphur dioxide and hydrogensulphide mix in the presence of water, the reaction is

$SO_2 + 2H_2S \rightarrow 2H_2O + 3S$. Here hydrogen sulphide is acting as -

(a) an oxidising agent (b) a reducing agent

(c) a dehydrating agent (d) a catalyst

For Assertion& Reason question follow the following directions.

DIRECTION:*Each of these questions contains an Assertion followed by Reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.*

(a) If both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

(c) If Assertion is correct but Reason is incorrect.

(d) If Assertion is incorrect but Reason is correct.

(e) If Assertion & Reason both are incorrect.

Q.4 Assertion(A) : In a reaction of copper with oxygen,copper serves as a reducing agent.

Reason (R) : The substance which gains oxygen in a chemical reaction is a reducing agents.

Q.5 Assertion : In the following chemical equation,

$CuO(s) + Zn(s) \rightarrow ZnO(s) + Cu(s)$

Zinc is getting oxidised and copper oxide is getting reduced.

Reason : The process in which oxygen is added to a substance is called oxidation whereas the process in which oxygen is removed from a substance is called

reduction.

Home assignment

Oxidation-Reduction Worksheet

For each reaction below, identify the atom oxidized, the atom reduced, the oxidizing agent, the reducing agent

1. **$Mg + 2HCl \rightarrow MgCl_2 + H_2$**
2. **$2Fe + V_2O_3 \rightarrow Fe_2O_3 + VO$**
3. **$H_2S + Cl_2 \text{----} \rightarrow 2HCl + S$**
4. **$4Na + O_2 \text{---} \rightarrow 2Na_2O$**
5. **$2Na + Cl_2 \text{-------} > 2NaCl$**
6. **$2Na + S \text{------} \rightarrow Na_2S$**
7. **$H_2S + 2FeCl_3 \text{-----} \rightarrow 2FeCl_2 + 2HCl + S$**
8. **$2Al + Fe_2O_3 \text{------} \rightarrow Al_2O_3 + 2Fe$**
9. **$3Fe_3O_4 + 8Al \text{----} \rightarrow 9Fe + 4Al_2O_3$**
10. **$Zn + 2HCl \text{---} \rightarrow ZnCl_2 + H_2$**
11. **$2HI + Cl_2 \text{----} \rightarrow I_2 + 2HCl$**
12. **$CH_4 + 2O_2 \text{---} \rightarrow CO_2 + 2H_2O$**
13. **$2NaClO_3 + I_2 \text{-----} \rightarrow 2NaIO_3 + Cl_2$**
14. **$2Al + 3Cu^{2+} \text{--} \rightarrow 2Al^{3+} + 3Cu$**
15. **$MnO_2 + 4HCl \text{--} \rightarrow MnCl_2 + 2H_2O + Cl_2$**
16. **$2H_2S + SO_2 \text{----} \rightarrow 2H_2O + 3S$**