

CSS 2014 - <sup>Difference between</sup> conductors and insulators

CSS 2021 - "Semiconductors are the brain of modern electronics" explain in detail. What this quotation means CSS 2021.

PMS 2018 - What are semiconductors?

## Semiconductors

### Introduction

Semiconductors are materials whose conductivity lies between conductor and an insulator. The common semiconductors include, silicon, germanium, selenium, and lead telluride. Semiconductor devices are the foundation of the electronics industry, which is the largest industry in the world, with global sales of over one trillion dollars since 1998. Semiconductors can be found everywhere in daily lives in automobile, washing machine, computers, televisions. Every thing that is computerized or uses radio waves depends on semiconductors.

# Modern materials/chemicals

## <sup>part</sup> <sup>conductor</sup> Semiconductors

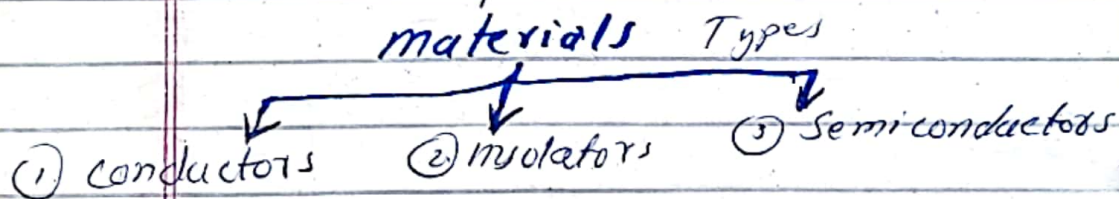
A material used in electrical circuits and components that partially conducts electricity.

- semiconductors are substances that conduct electricity under certain conditions i.e. they require a medium for the conduction of electricity.
- They have ~~po~~ partial properties of both conductors and non-conductors.

Sir Azhar class-

### Semiconductors:

materials/substances in the world can be classified into three types on the basis of electrical properties



**conductors:** - easily allow inflow of current  
These are the materials which can conduct electricity

Example Iron, steel, silver

**Insulators:** <sup>→ hardly allow inflow of current.</sup> These are the materials which do not conduct electricity such materials are called insulators.

Example of insulators.

plastic, drywood, rubber, glass insulators.

**Semiconductors:**

Semiconductors are the materials ~~which~~ having electrical properties in between the conductors and insulators

example of semiconductors are silicon, Germanium, selenium.

Semiconductors are used in electronics to control current.

semiconductors are further divided into two types:

(i) **Intrinsic semiconductors**

A semiconductor in its pure form is called intrinsic semiconductor.

(ii) **Extrinsic semiconductor**

When impurity is added to a pure semiconductor, it becomes extrinsic semiconductor. Doping is another term used for extrinsic semiconductor.

Any doped conductor is called extrinsic semiconductor.

Doping — it is the process of addition of impurity.

Example of insulators.

plastic, drywood, rubber, glass insulators.

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## Subtypes of Extrinsic Semiconductor:

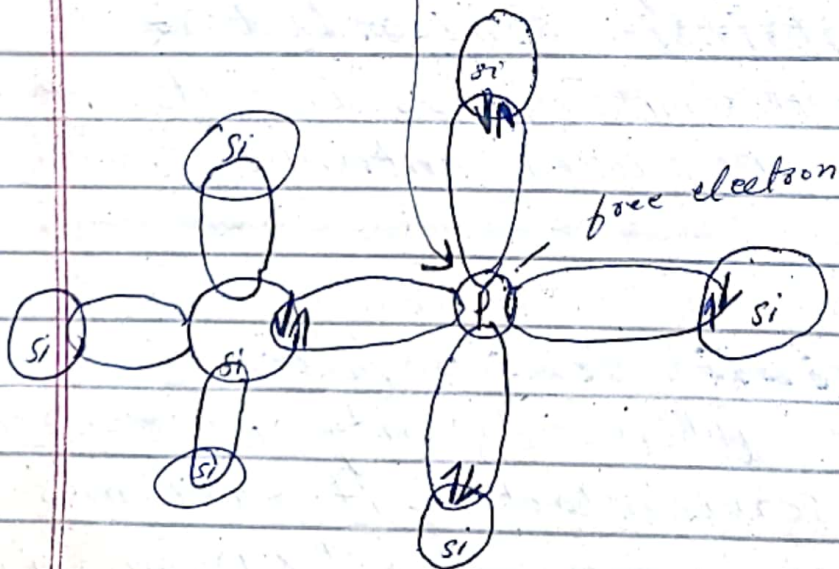
### (i) N-type Extrinsic semiconductor

When impurity is added to a pure semiconductor from V group of periodic table.

#### Explanations

III	IV	V
Al	Silicon German	P → phosphorus

group  
No. = No. of Bonds

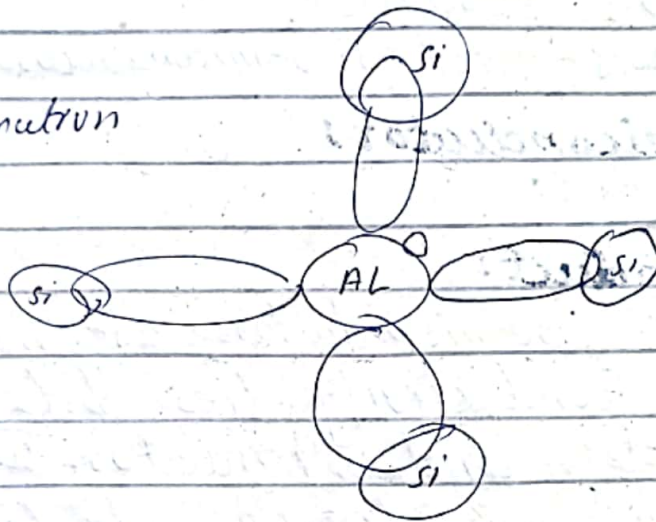


Here phosphorus is added impurity is added ~~from~~ to a pure semiconductor from V group of periodic table.

## P-type Extrinsic semiconductor

When impurity is added ~~from~~ to a pure semiconductor from III group of periodic table

Explanation



Hole is just a deficiency of electron

Deficiency of electron bring positive charge

Hole behaves like proton as proton is positive, so hole is positive

It behaves like proton but not practically protons.

Semiconductors are used in all electronic circuits.  
electronic devices.

## ~~Types~~ Classification of materials on the basis of electric properties:

Generally, some materials does not let the current to pass and some other let the current to pass. This shows that current can pass through some materials and cannot pass through some other materials. These are classified into three types.

### Conductors:

The materials through which current can pass are called ~~ins~~ conductors. Conductors allow the current to flow through it with the application of voltage like copper. The iron or copper wires and other metallic objects are conductors.

### Insulators:

The materials through which current cannot pass are called insulators. The materials like wood, rubber and plastic are insulators. parts of electric appliances are made up of insulators which are to be touched or held with hands. This to avoid the danger of electric shock.

## Types of semiconductors

- ① Intrinsic semiconductor,
- ② extrinsic semiconductors

↓  
subtypes

N-Type extrinsic semiconductors

P-Type extrinsic semiconductors

## Importance of semiconductors

Semiconductors are very important in modern era. Anything that is computerized or uses radio waves depends on semiconductors. Semiconductor devices are the foundation of the electronics industry.

~~Due~~ Semiconductors are the Brains of modern electronics. Semiconductors are all around us.

Due to their role in the fabrication of electronic devices, semiconductors are ~~are~~ important parts of our lives.



Imagine life without electronic devices. There would be no smartphones, radios, TVs, computers, video games, or advanced medical diagnostic equipment:

## Uses of Semiconductors

Semiconductors are used in all electronic circuits. They are used for manufacturing electronic devices.

Semiconductors are used in smartphones, computers, washing machines. They are used in electronic devices, TVs, advanced medical diagnostic equipments.

## Conclusion:

- (A) Introduction
- (B) Semiconductors
- (C) Diagram
- (D) Types of semiconductors
- (E) Importance of semiconductors
- (F) Uses of semiconductors
- (G) Conclusion