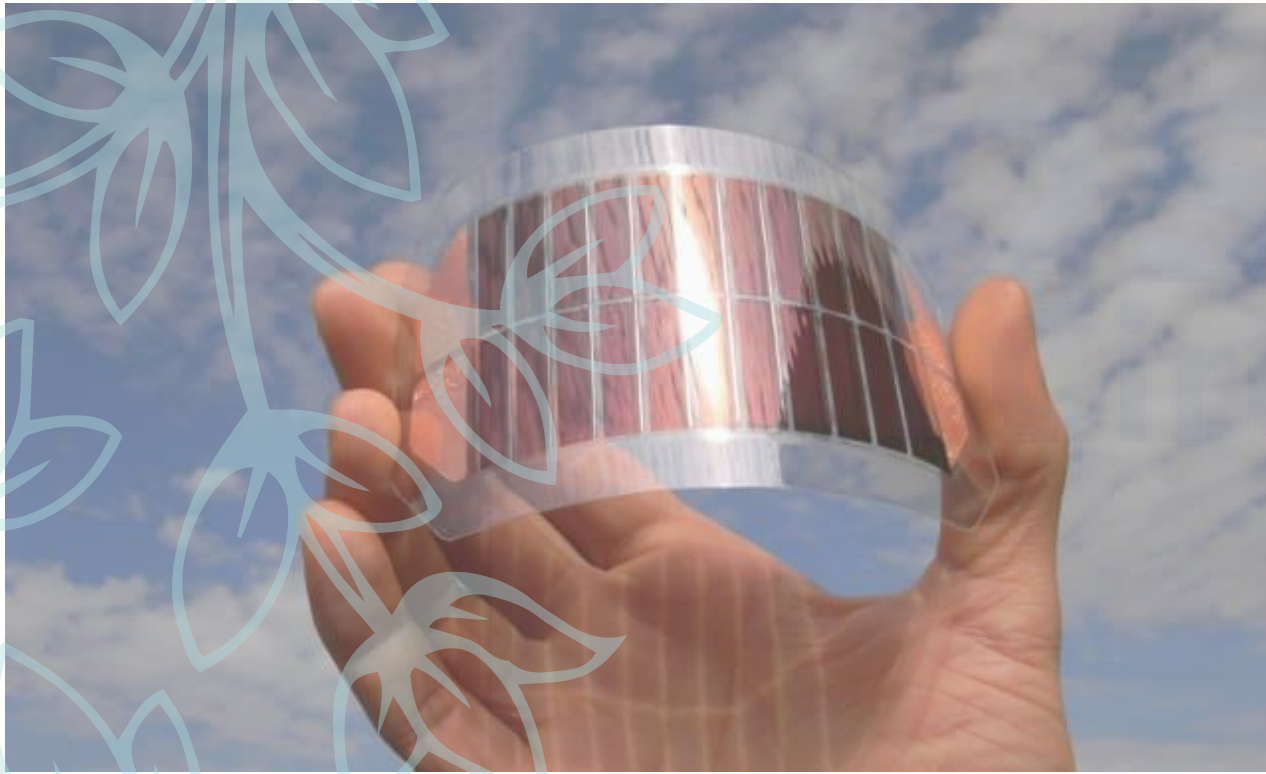




Technology

Part -IV

What's in the news?



Organic Solar Cells

Questions arise...



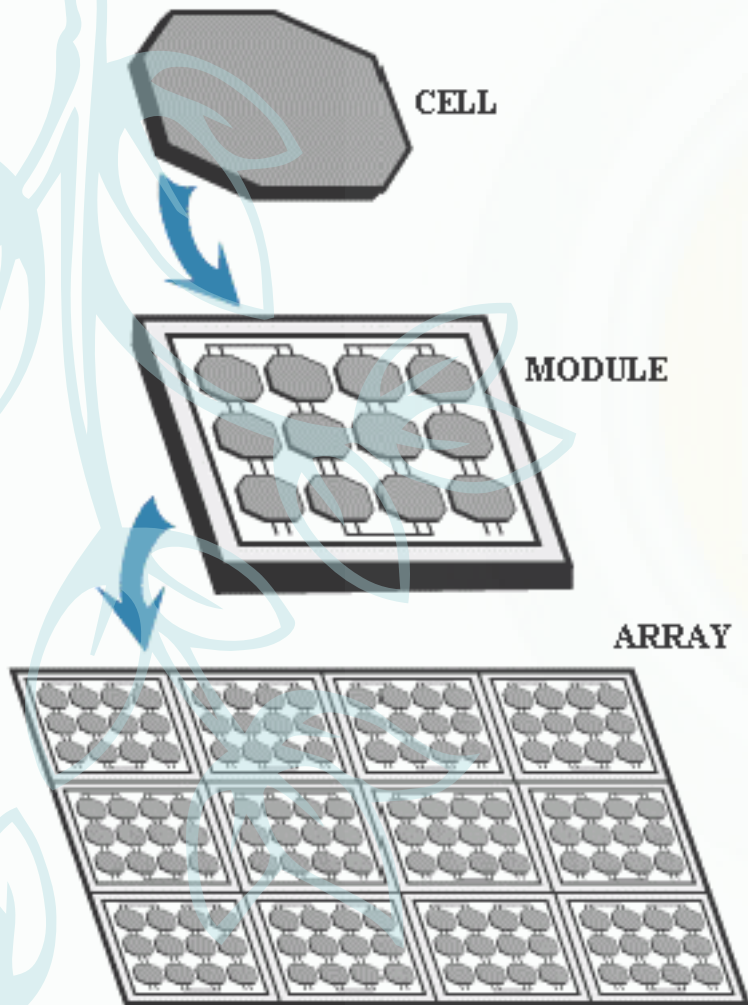
- What is a solar cell?
- How does it work?
- What is an organic solar cell?
- How is it different from a normal solar cell?

What is a solar cell?



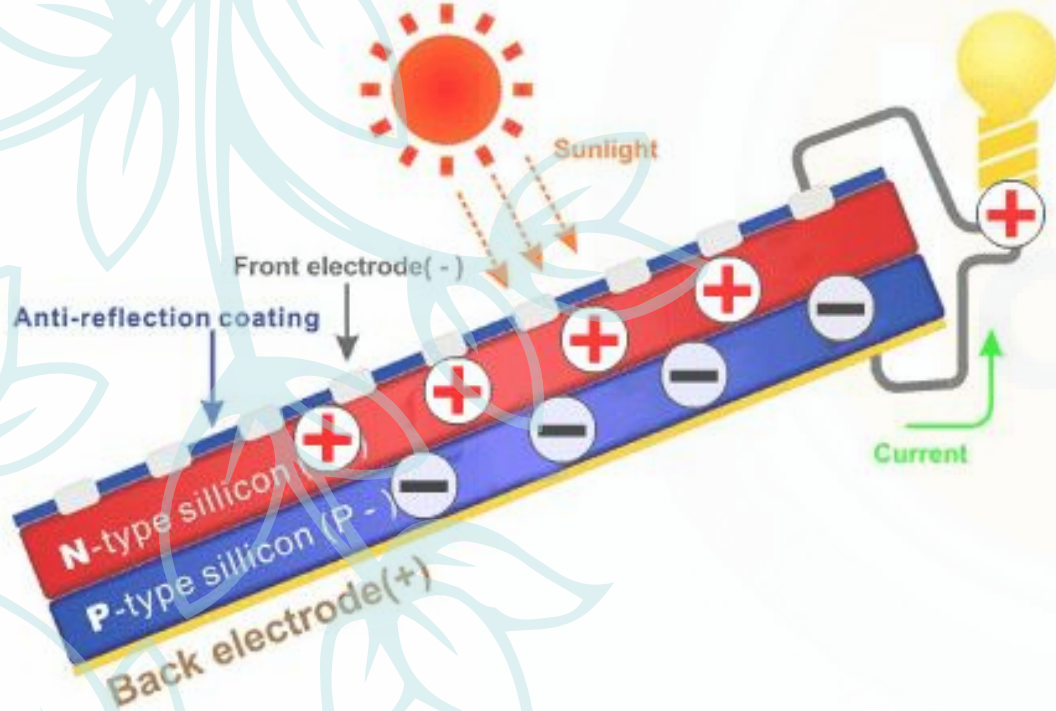
- A solar cell, or photovoltaic cell, is **an electrical device** that **converts** the **energy of light** directly **into electricity** by the **photovoltaic effect**.
- Unlike batteries or fuel cells, solar cells **do not utilize chemical reactions** or require fuel to produce electric power, and, unlike electric generators, they **do not have any moving parts**

How does it work?



- Light enters the device through an optical coating, or **antireflection layer**, that **minimizes the loss of light** by reflection
- It effectively traps the light falling on the solar cell by promoting its **transmission to the energy-conversion layers** below, made of **semiconductors**.

How does it work?



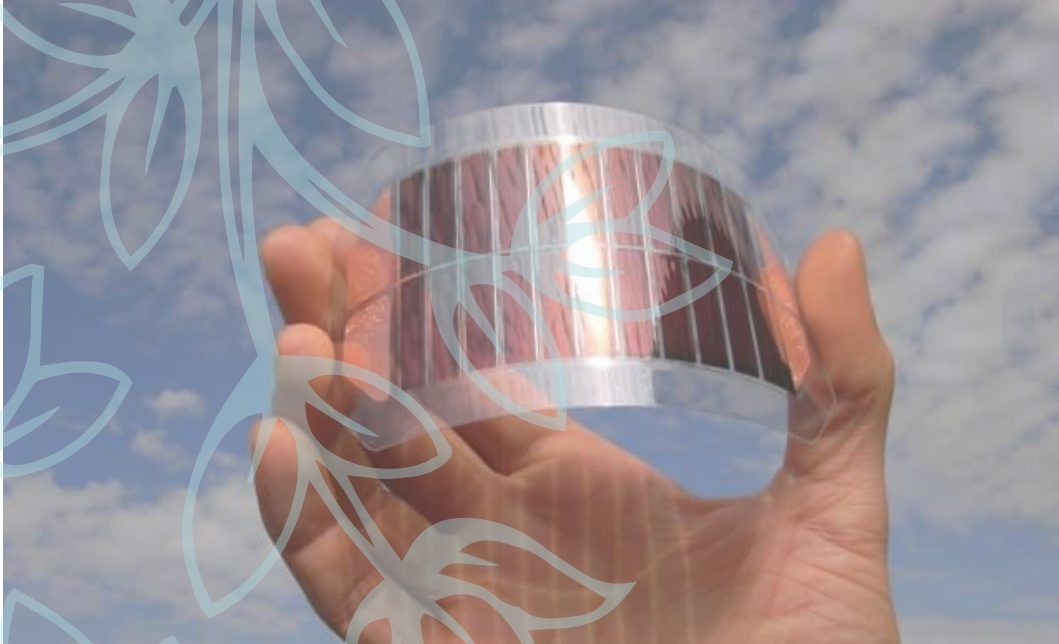
- Photovoltaics is the direct **conversion of light into electricity** at the atomic level.
- **Some materials exhibit** a property known as the **photoelectric effect** that causes them to **absorb photons** of light **and release electrons**.
- When these **free electrons** are captured, an **electric current results** that can be used as **electricity**

What is organic solar cell?



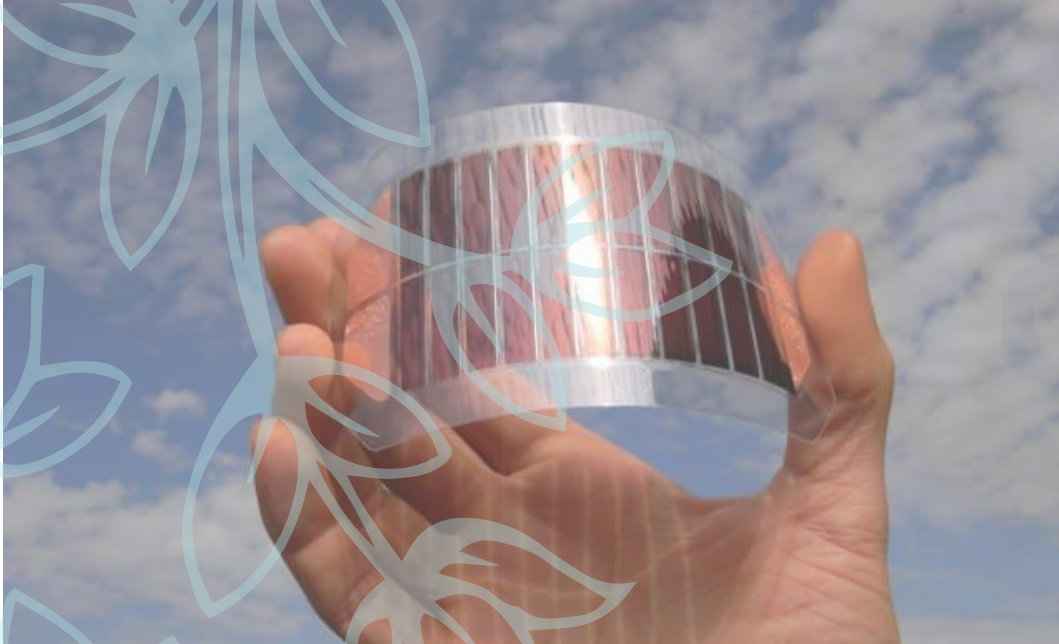
- An organic solar cell or plastic solar cell is a type of photovoltaic cell that **uses organic electronics**.
- **Organic electronics** is a branch of electronics that **deals with conductive organic polymers** or small organic molecules, **for light absorption and charge transport** to produce electricity from sunlight by the photovoltaic effect.

How does it work?



- An organic solar cell is **made up of acceptor and donor** materials.
- The **donor absorbs light** from solar radiation and the **harvested energy is passed to the electrodes with the help of the acceptor.**
- **Collection of charges** at relative electrodes **results into** generation of **electricity.**

Advantages



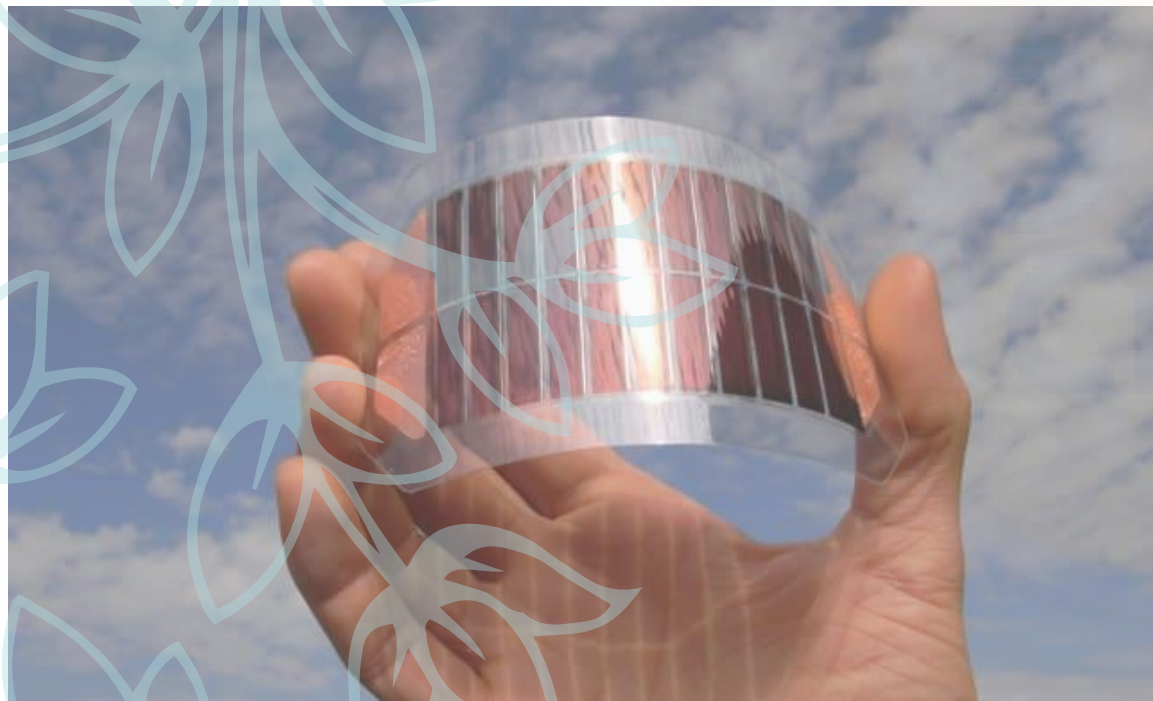
- It is **light** in weight.
- It is **semi-transparent**.
- It is **environmental friendly**.
- Organic Solar cells are **1000 times thinner** compare to silicon solar cells. Hence it results into **huge savings on materials** and consecutively they are **cheaper**.
- It is **flexible**.

Disadvantages



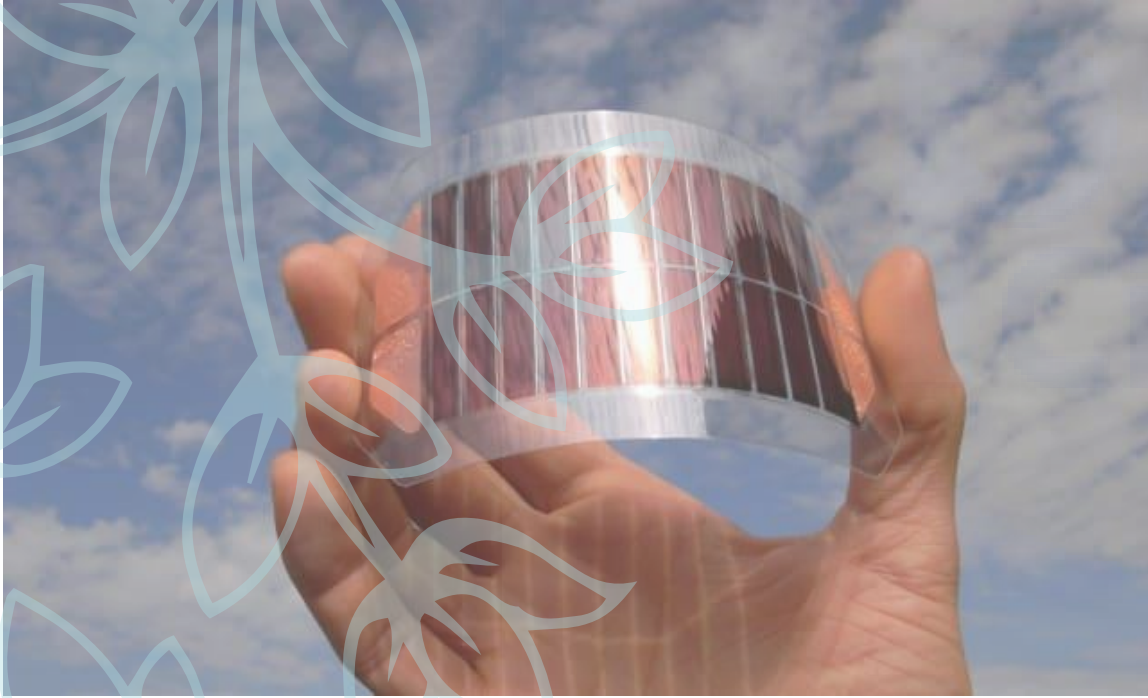
- The **efficiency** of organic solar cells **is less** (about 5%) compare to silicon solar cells (about 15%)
- **Poor generation** as well as extraction of electrical charges in OSC => **low efficiency**
- **Lesser lifetime** as organic materials degrade rapidly in ambient exposure

Why in news?



- Researchers at the Indian Institute of Science Education and Research (**IISER**) **Bhopal** have **developed cheaper** and **more flexible organic solar cells using** a **synthetic** derivative of **vitamin B12**.
- They **synthesised** the **donor using** an artificial aromatic chemical (**corrole**) which has a similar structure to the Corrin ring in vitamin B12.

Why in news?



- The **artificially synthesised corrole** (Cor- BODIPY) **absorbs light** much **like porphyrin** in natural **chlorophyll**.
- **Corroles** have very **good photophysical properties** which show **excellent absorption** in the visible light range and are **highly stable**.
- They are **very flexible** unlike the silicon solar cells and so could be **used in flexible electronics**.