



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF MECHANICAL ENGINEERING

19MEZ402 SOLAR PHOTO VOLTAICS FUNDAMENTALS AND TECHNOLOGY

UNIT 1 – INTRODUCTION TO SOLAR PHOTOVOLTAICS

TOPIC – Structure ,Working & Types of Solar Cells



amazon.com



flickr.com

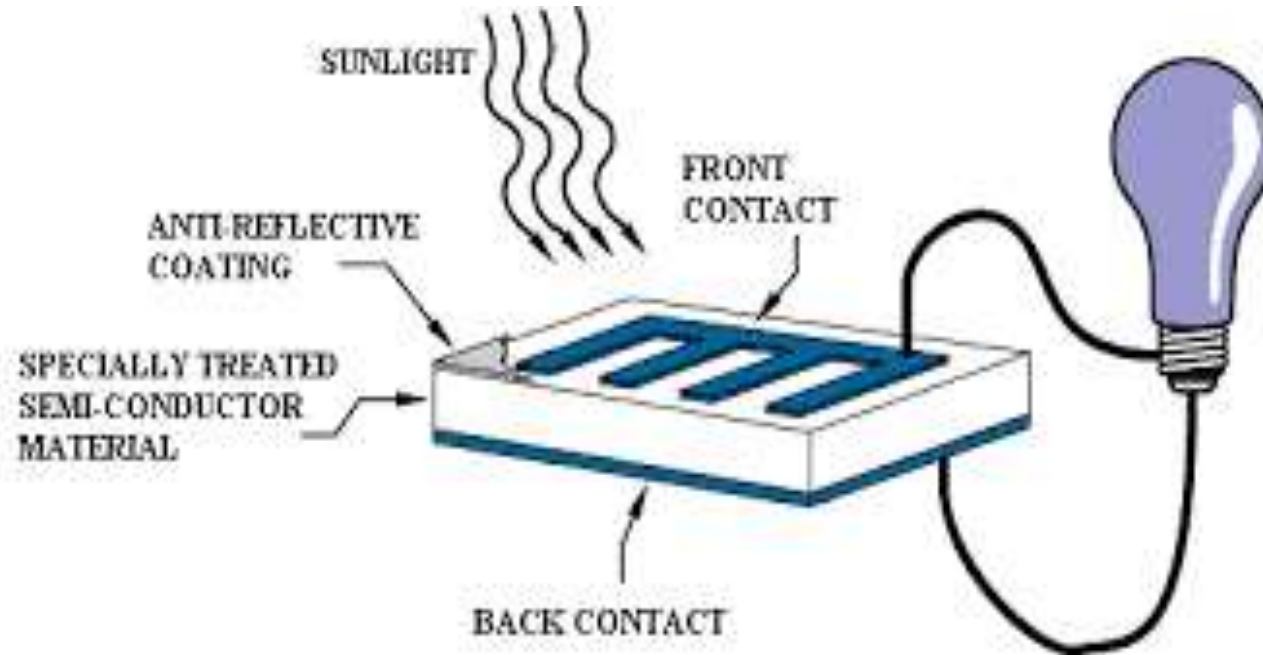
- Torch powered by Batteries
- Solar energy is used
- Topic is Structure ,Working & Types of Solar



flipkart.com



Solar Cell-Principle



- Solar cell is a photovoltaic device
- Converts the light energy into electrical energy



Solar cell-Properties



azocleantech.com

- Semiconductors are electrically conductive
- Supplied with light or heat
- Operate as insulators at low temperatures



Materials for Solar cell

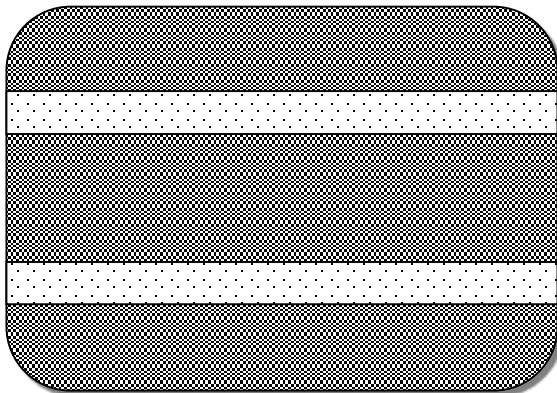
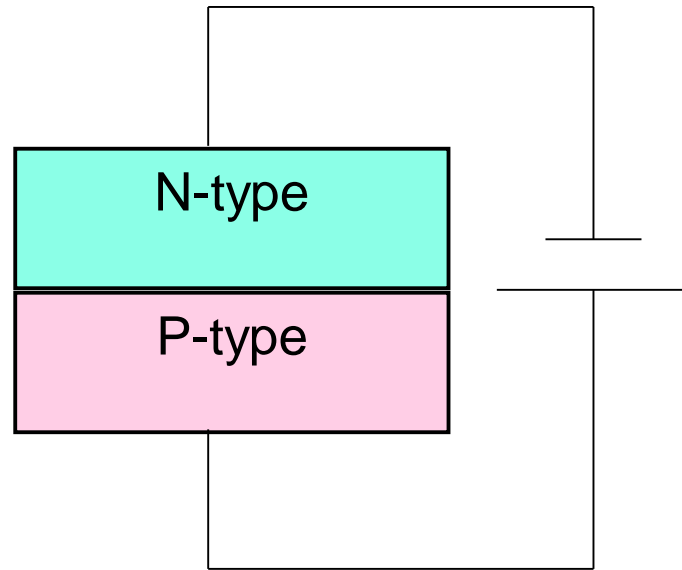


phys.org

- Crystalline silicon
- Cadmium telluride
- Copper indium diselenide
- Gallium arsenide
- Indium phosphide
- Zinc sulphide



Single Solar Cell

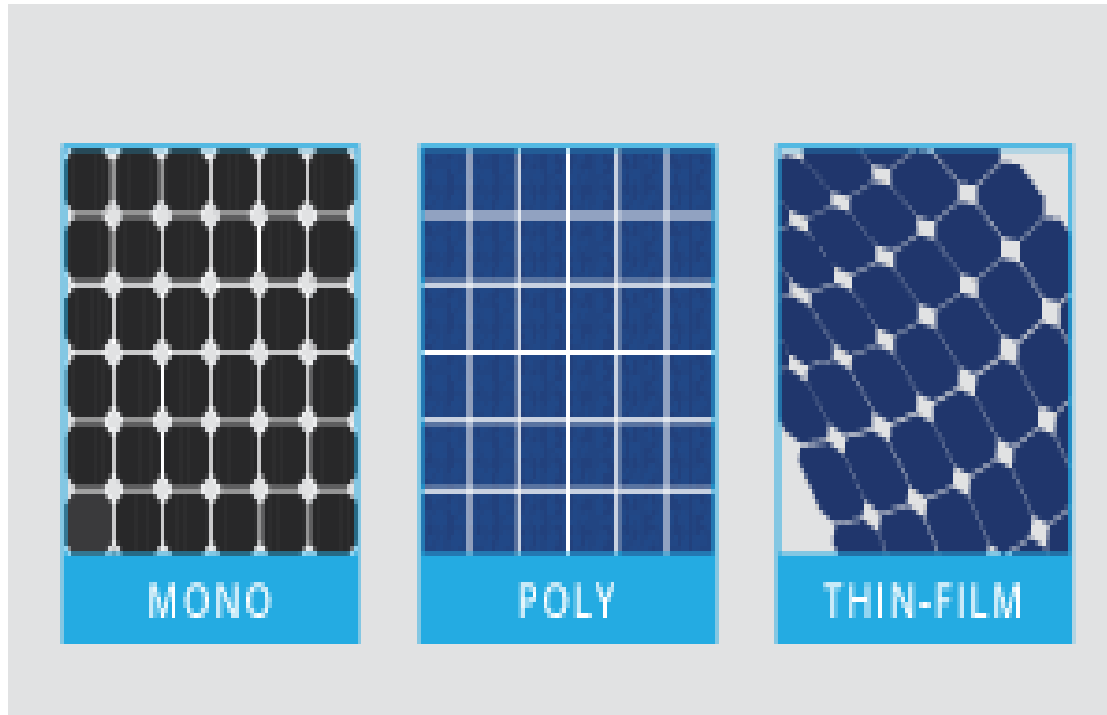


slideshare.net

- The single solar cell -n-type layer sandwiched with p-type layer
- Configured as a large-area
- p-n junction made from silicon wafer
- A single cell can produce only very tiny amounts of electricity
- Light up a small light bulb or power a calculator



Types of Solar Cell



energysage.com

- Polycrystalline silicon cells
- Amorphous silicon cells
- Monocrystalline silicon cells



Monocrystalline silicon



slideshare.net

- The Monocrystalline silicon cell is produced from pure silicon (single crystal)
- Monocrystalline silicon is pure and defect free
- The efficiency of cell will be higher



Polycrystalline Solar Cell



solarreviews.com

- In polycrystalline solar cell, liquid silicon is used
- Solidification process.
- The materials contain various crystalline sizes
- Efficiency of cell is less



Amorphous Silicon

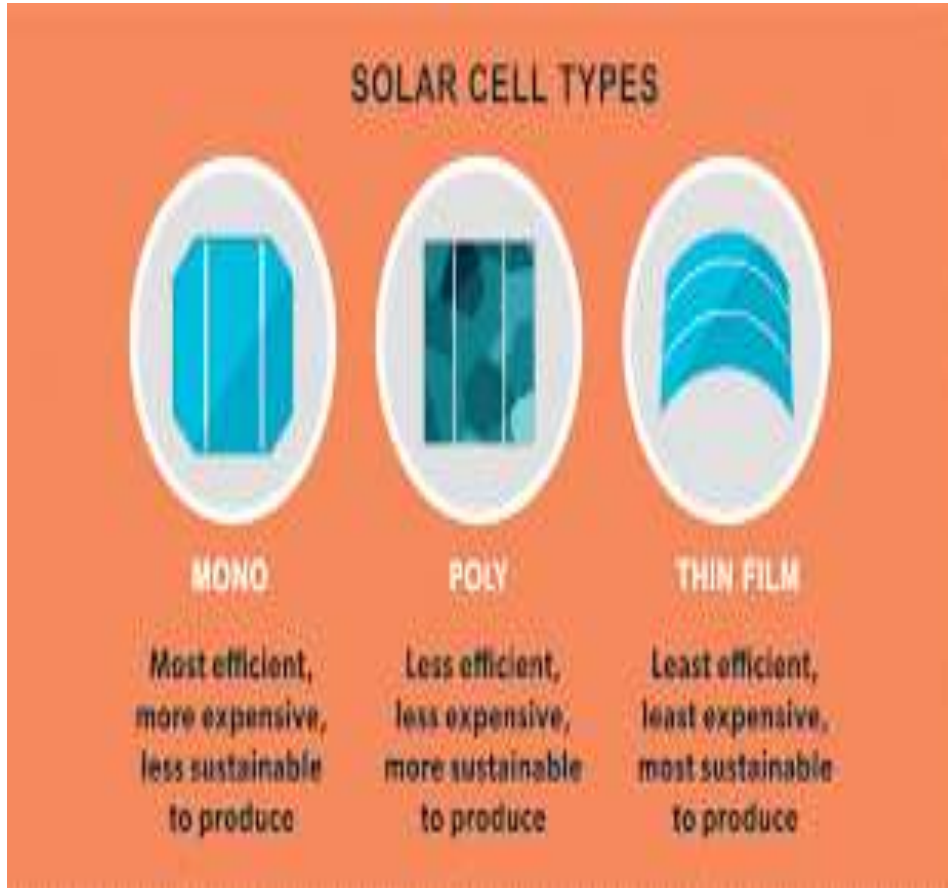


en.wikipedia.org

- Silicon film on the substrate like glass plate
- The layer thickness amounts to less than $1\mu\text{m}$
- The efficiency of amorphous cells is much lower
- Watches and pocket calculators



Comparison of Types of Solar Cell



wholesalesolar.org

Material	Efficiency (%)
Monocrystalline silicon	14-17
Polycrystalline silicon	13-15
Amorphous silicon	5-7



Assessment 1-MCQ



1. Which of the following materials cannot be used as solar cells materials?

- a) Si
- b) GaAs
- c) CdS
- d) PbS

2. Which of the following should not be the characteristic of the solar cell material?

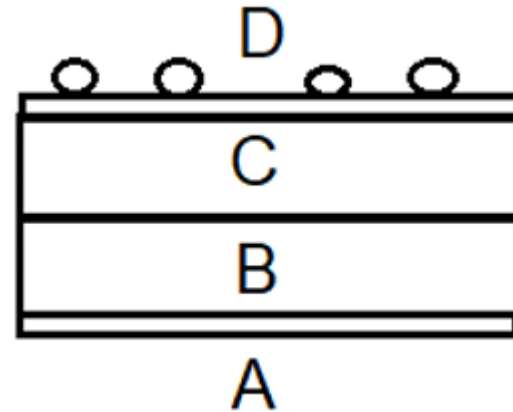
- a) High Absorption
- b) High Conductivity
- c) High Energy Band
- d) High Availability



Assessment 1-MCQ



3. Which of the following region is coated with a metal and why



- a) A
- b) B
- c) C
- d) D



Assessment 1-MCQ



4. The amount of photo generated current increases slightly with increase in _____

- a) Temperature
- b) Photons
- c) Diode current
- d) Shunt current

5. _____ photo voltaic devices in the form of thin films.

- a) Cadmium Telluroide
- b) Cadmium oxide
- c) Cadmium sulphide
- d) Cadmium sulphate



References

- www.ngridenergyworld.com/environment/t_rew_book.html
- www.wiley.com/WileyCDA/.../productCd-3527657037.html
- www.inference.phy.cam.ac.uk/sustainable/book/tex/cft.pdf

Thank You