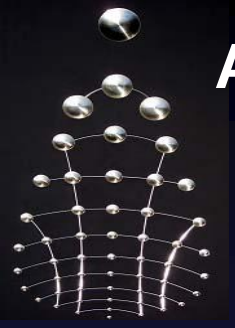
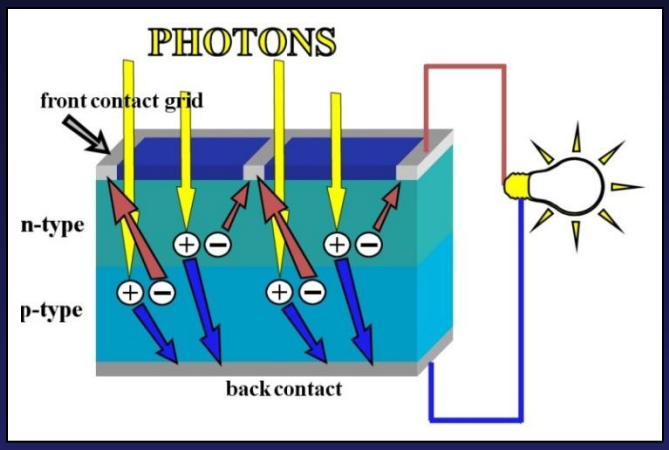
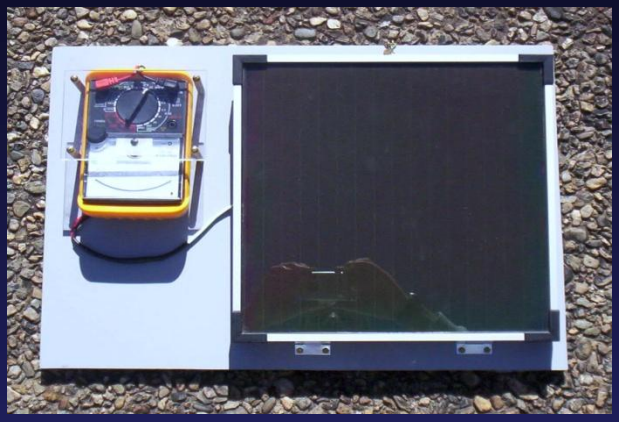


Amorphous Solar Cells

What to do

1. Change the angle of the solar panel in relation to the light
2. Observe the current output and compare with the other types of solar cells

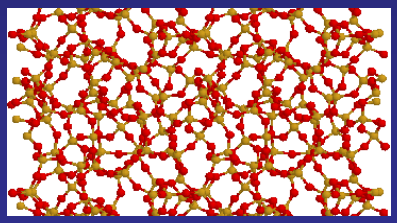




Amorphous Silicon

The term ‘Amorphous’ originates from Latin and means ‘without shape’. The silicon atoms in amorphous cells are not arranged in crystal lattices, but continuous disordered networks.

The atoms are deposited in this arrangement by allowing ionised silicon gas to form a solid layer on the surface of a material under carefully controlled conditions.



Unlike mono- and poly-crystalline silicon manufacturing, this process can be carried out at low temperatures and over large areas, so a film of atoms can be deposited over entire sheets of plastic or glass.

Amorphous silicon solar panels (also called ‘Thin Film’ panels) can be recognised as there are no separate ‘cells’ in the solar panel – it will appear as a continuous area of silicon. Also any flexible panel is manufactured with this type of silicon.

Amorphous solar cells are not as efficient as mono- or poly-crystalline cells as the electrons encounter many inconsistencies in the silicon network, however the cells are inexpensive to manufacture and use significantly less silicon.

A solar cell transforms light energy into electrical energy. Each cell is composed from two layers of silicon with upper and lower electrodes.

The top layer of silicon is doped with an electron-rich element such as phosphorus and carries a negative charge (‘n-type’). The bottom layer of silicon is doped with an electron-poor element such as boron and carries a positive charge (‘p-type’).

Where the two layers meet, free electrons from the n-type silicon have moved into the p-type layer forming a ‘depletion zone’ with a neutral charge. Electrons from the n-type silicon are unable to pass through this barrier.

When photons hit the n-type silicon they provide energy to free bound electrons. These electrons cannot pass through the depletion zone so instead they travel to the electrodes and through the wire to the p-type silicon. This creates a flow of electrons in the wire and hence electricity!

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