

How Things Work: Solar cells

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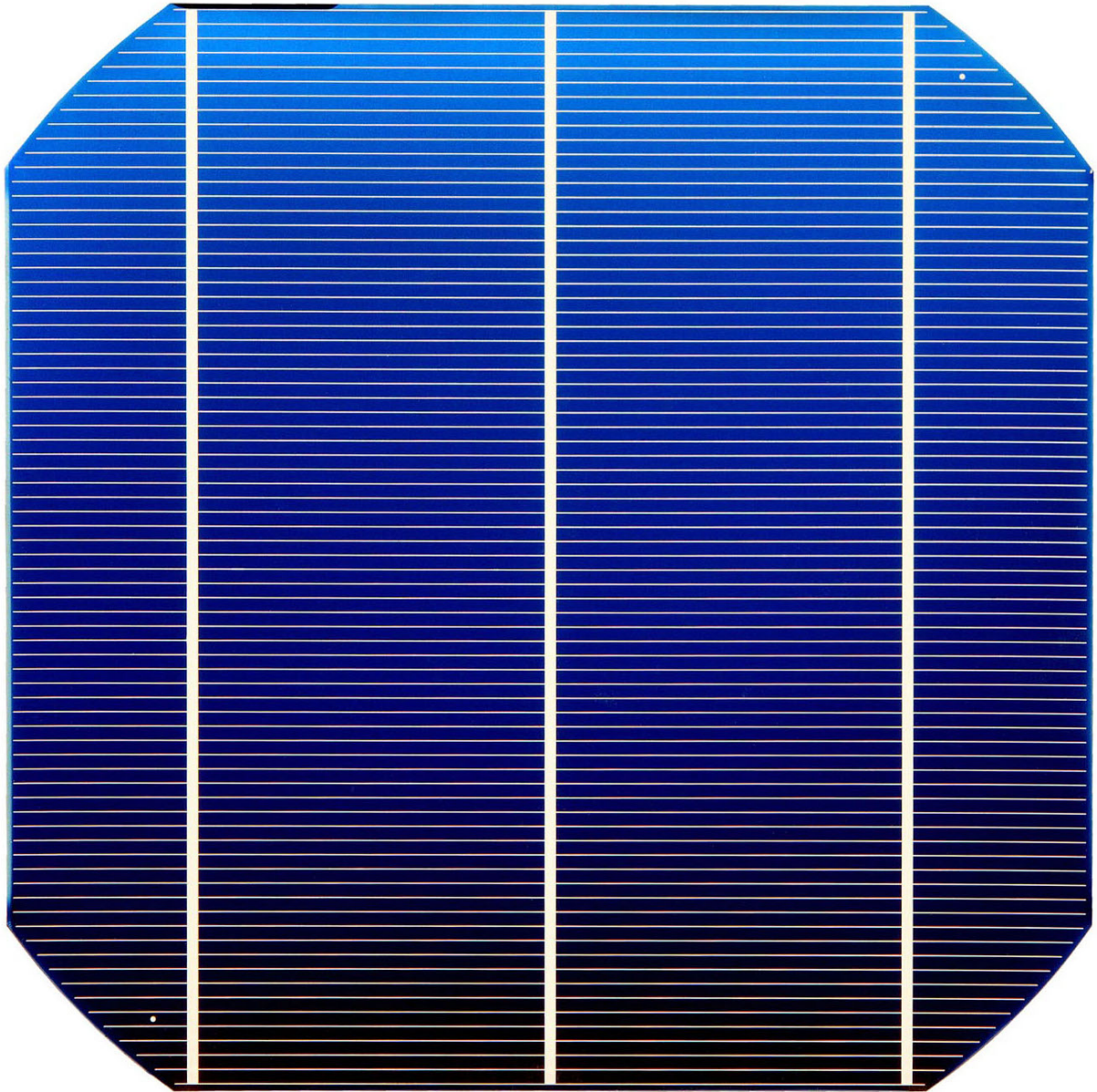
Level **840L**



Solar panels can be used for many different devices. They can give power to tools at home. Or they can power buildings and satellites. Image from Pexels.

A solar cell is a tool that takes in sunlight and makes electricity. Solar cells can power many things, from calculators to space stations. A battery may run out, but the sun never will, at least not for another 5 billion years.

Power For An Industrialized Society



People have used the power of the sun for a very long time. Ancient Romans and Native Americans made buildings that took advantage of the sun's heating and lighting power.

Later, scientists learned that there were connections between sunlight and electricity. About 130 years ago, Charles Fritts made one of the first solar cells. Years later, Albert Einstein explained the photoelectric effect. He showed that if you shine a light on certain elements, they will make electricity.

Solar cells are based on this idea. The first solar cell as we know it today was made 60 years ago. Solar cells have become more popular, and many experts believe that they will be important for sustainable energy in the future. This means creating energy without destroying parts of nature forever.

Raw Materials

But what are solar cells made of? The most important part of a solar cell is a material called semiconductor.



Metals let heat and electricity flow through them. You can see this if you touch a hot metal pan or use a copper wire. Nonmetals do not let heat or electricity flow. But there is also a group in between, called metalloids.

Metalloids are like metals in some ways and like nonmetals in other ways. Metalloids are semiconductors, which means they let electricity flow through them when they get hot, but not when they get cold.

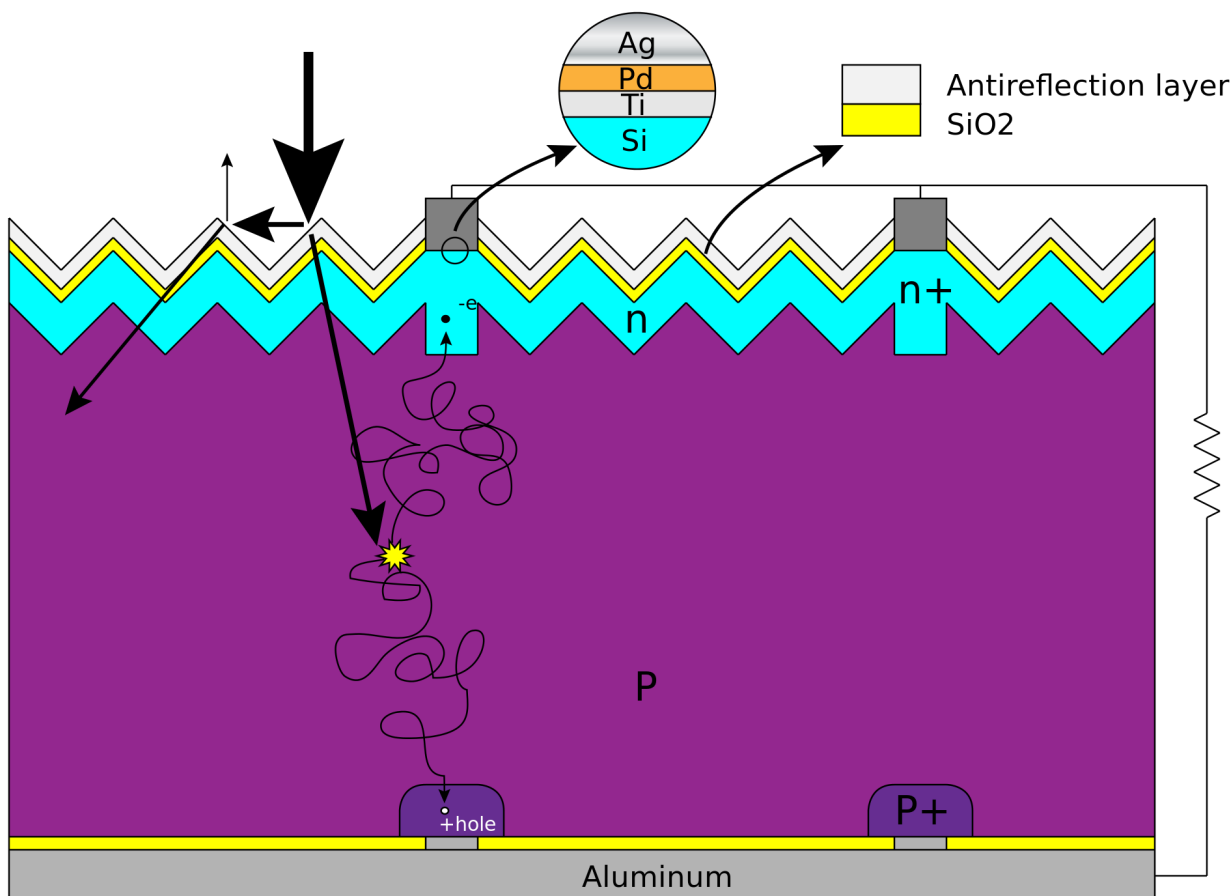
Many solar cells use silicon as a semiconductor. This is handy because silicon is the second-most common element on Earth.

Design

Solar cells are made of thin layers stacked on each other. Each layer is made of different materials and has a certain job.

When sunlight hits a solar cell, it first hits the top layer. This layer is for protection, and is usually made of clear glass or plastic. It covers another layer, called the antireflective layer. Its job is to capture as much light as possible. Under this layer, there is a grid of very thin metal wire. This helps collect and send the electricity made in the cell. The bottom layer of the cell is also usually made of metal.

Between the two metal layers, there is the absorber. This is where sunlight is turned into electricity. The absorber is made of a semiconductive material, usually silicon. But to understand what happens here, we first need to learn a bit about electrons.



All physical things are made up of tiny parts called atoms. These are made up of even smaller parts, such as electrons. Electrons can get excited by heat and light. If they take in enough energy, they can jump off of their atom and move freely.

In order to make solar cells, silicon is mixed with other elements. This is called doping. When certain elements mix with silicon, some of their electrons break free. This creates extra electrons that can flow freely. When the electrons become excited with sunlight, they get the extra push they need to move across the cell.

These moving electrons are what make up the cell's electrical current. At this point, you can plug the cell into your phone and use the sun to charge it!

Many Uses For Solar Power

Solar energy can be used in many ways, such as powering homes and tools for cooking food. Some people have used solar lights to light up their jack-o'-lanterns at Halloween.

Scientists are even working on new solar cells that can bend. These could turn your umbrella or your clothes into a charger.