



How to build a low tech solar panel?

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Why & How?

- Solar panels use silicone or coated glass cells to capture sunlight and generate electricity
 - If you want to make a basic solar cell, all you'll need is a few household items, titanium dioxide, and conductive glass.
 - You can create a small, basic solar cell that generates a modest current! While making a simple titanium dioxide solar cell is great for classroom or science fair projects, it's not the most functional device. If you want a working solar panel, build one using store-bought cells.
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How to build a small basic solar cell at home?

Step 1,

Mix titanium dioxide powder with alcohol and dish soap to form a paste. Combine 0.5 grams of nanopowder with enough alcohol to create a mixture that's about as thick as toothpaste. Use a high-proof spirit, such as 40-proof or higher vodka or grain alcohol. Then mix in a drop of clear dish soap, which will help the paste adhere to your conductive glass.

- High-proof alcohol is needed to crystallize the titanium dioxide so it can absorb solar energy. Sunlight excites electrons in the crystallized titanium, which generates electricity.

Step 2,

Apply an even layer of titanium paste onto a square of conductive glass. Apply the titanium paste with an eye dropper, then use a microscope slide or blunt knife to spread it into a thin, uniform layer. The thin layer should be roughly flush with the tape. Conductive glass can be purchased online

Step 3

Heat the glass on a hot plate for 10 to 20 minutes. The browning stage burns off the alcohol and dish soap, leaving behind a pure, dry layer of titanium dioxide

Step 4

Soak the cooled glass in strong hibiscus/raspberry tea for 2 to 3 hours.

- Dyeing the coating enables it to absorb visible light. If you leave it white, it'll only absorb ultraviolet (UV) light and won't generate a current

Step 5

Color the center of a second glass square with a graphite pencil.

- To create a counter-electrode, An ordinary pencil will do the trick.

Step 6

Add a drop of electrolyte solution to the center of the titanium square. Look for electrolyte solution online, at health stores, and at aquarium suppliers.

- The alcohol and Lugol's solution create an electrolyte that carries and transfers the electrical charge generated by the titanium dioxide

Step 7

Sandwich the 2 glass squares and secure them with binder clips

Step 8

Place the cell in sunlight and check its charge with a multimeter. You should now have a functioning solar cell!

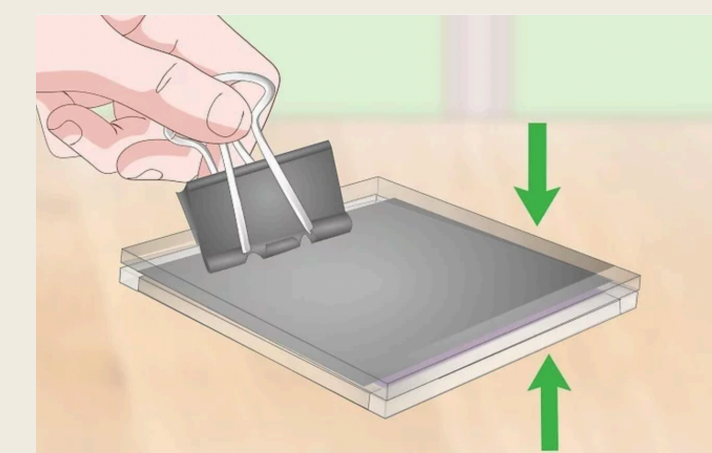
Step 1



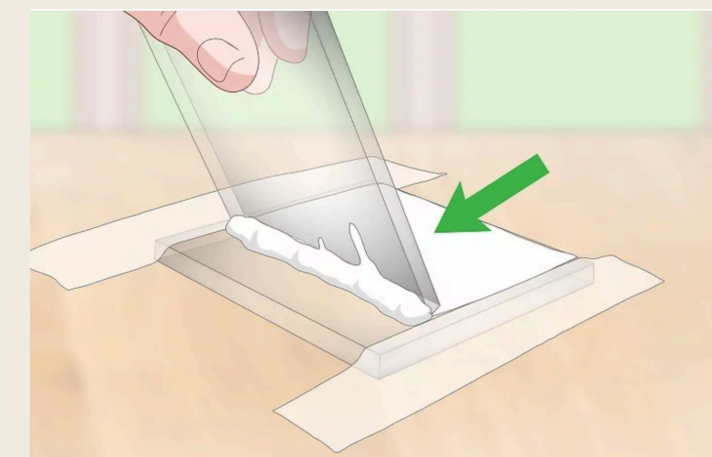
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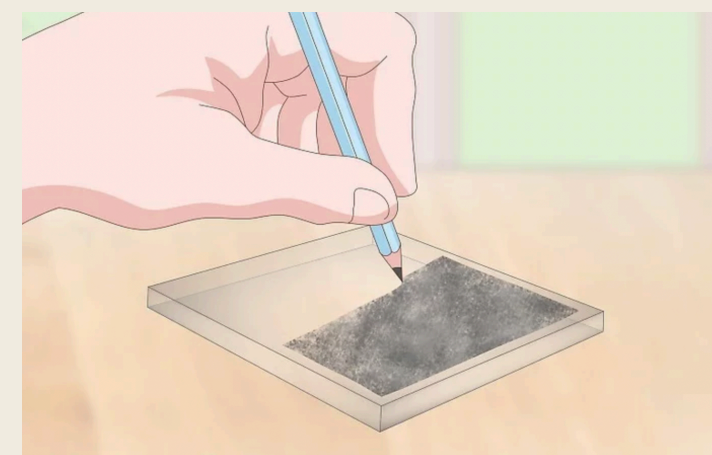
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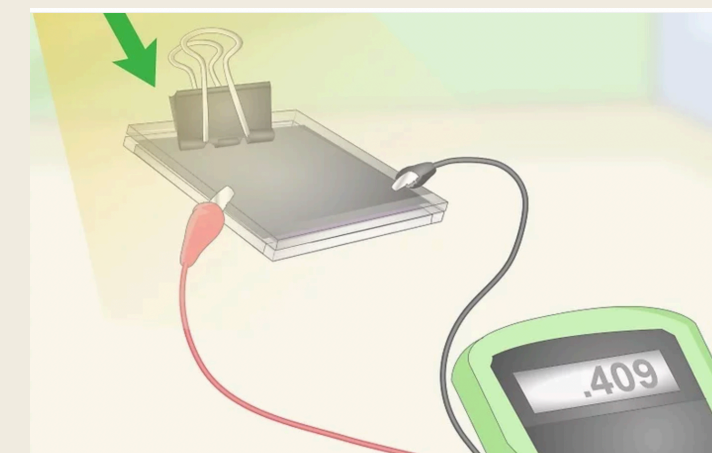
Step 2



Step 5



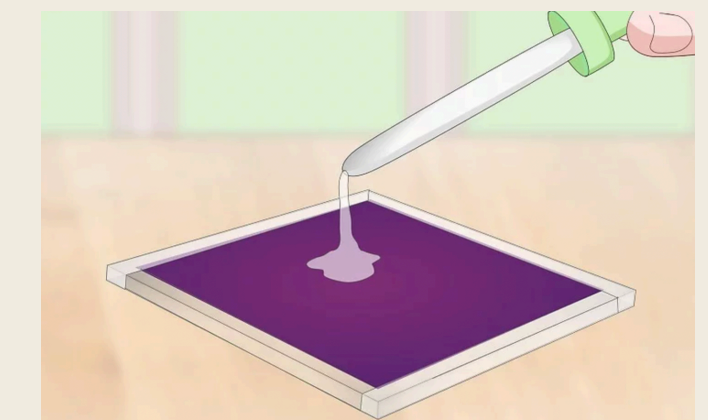
Step 8



Step 3



Step 6



Problematics with solar pv? Future & Solution

- **The efficiency** of solar panels increased from less than 5% in the 1950s to over 20% today, while the costs decreased from 30 dollars per watt-peak in 1980 to less than 0.2 dollars per watt-peak in 2020.
- **Lower costs** – allow solar PV panels to compete in the market with electricity generated by fossil fuels
- In terms of **sustainability**, very little progress has been made. Since the 1950s, solar panels have been unfit for recycling, resulting in a waste stream that ends up in landfills. There are very limited places that can recycle an ordinary panel tex, UK. This waste stream will grow significantly during the coming years. Solar panels are discarded only after at least 25 to 40 years, and most have been installed only in recent years. By 2050, researchers expect that almost 80 million tonnes of solar panels will reach the end of their lives.
- **Reliance** on one market source that is china- production of solar panels on a more local level is needed, to create a more sustainable panel more fit for recycling & repair, lasting longer, and more control in avoiding using harmful materials.
- Future: **Solar windows & Solar PV films etc.** - 15% energy generation (20% in a normal panel)
- More manufacturing is happening in Europe, especially Germany.



https://www.asca.com/?gad=1&gclid=Cj0KCQjw6cKiBhD5ARIsAKXUdyaH_jijL1Srbn1CUqqYDu4IvLNyDhK3IH3EtDyx6GKyGTXj3ohrq8aAnCDEALw_wcB

Source:

<https://solar.lowtechmagazine.com/2021/10/how-to-build-a-low-tech-solar-panel.html>

<https://www.greenmatch.co.uk/blog/solar-windows>