

## Homemade Solar Cells - How To Make a Solar Cell

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*Learn how to make a solar cell step-by-step. Solar cell is an important component to creating a solar panel. If you can achieve this, you can start building your very own solar panels and generate free supply of electricity from the sun.*

Homemade Solar Cells - In the very first step, you'll need to prepare some essential items to make a solar cell. These items include the following:

- Copper Sheeting
- Clear Plexiglass/Perpex/Acrylic Sheeting
- Some Thin Wood Strip
- copper Wire
- Duct Tape
- Metal Guillotine
- Bandsaw
- Electric Ring Hob

To get started, cut a square of the copper sheeting so that it is about 6-8 in. square in size. It is much easier to do with a metal guillotine, however, if you haven't got access to this sort of equipment, tin snips will work just fine.

After you've done this, wash your hands thoroughly and dry them. You need to remove any grease or oil from your hands that could cause problems with the next step of the process. Remove any grease or detritus from the copper sheeting. Next, take a piece of emery cloth and thoroughly sand down the piece of copper on both sides to remove the top layer of oxidized copper. This will leave you with nice bright shiny red copper underneath.

You now need to heat treat the copper, in order to form an oxide coating on top. It may sound counter intuitive that we have just removed all the oxide and now we are going to put oxide back on, but the oxide coating we will be applying will be a film of "cuprous oxide".

You need to turn the burner to the highest setting, with the sheet of copper just placed on top. Observe the changes to the copper carefully, they are very interesting. As you heat the copper, it takes on a lovely vivid patina of different colours.

If you have access to nitric acid, you can use this as a superior method for removing the upper cupric oxide layer.

You will see a black crusty oxide form on top of the copper plate. If you leave the plate to cool slowly, the crusty layer should become fairly fragile and separate easily from the underlying copper. When you have allowed the plate to cool thoroughly, give the plate a firm bang edge-on to a hard surface. Some of the oxide will pop off. Rub the oxide gently with your fingers under a tap, and you will find most of the black layer of oxide comes off easily. If any bits are stubborn, do not under any circumstances scour them, as we do not want to damage the fragile surface.

Under this black layer of oxide, you will find another layer of a reddish orange rust colour. This is the layer

which is "photosensitive" and will make out thin-film solar cell work.

Make a spacer now from some thin strips of wood. Use duct tape to join your pieces of wood together. Do not use metal fixings as they could react electrolytically with the other components of the cell.

We are now going to make another electrode. It has to have the property that it does not touch the other piece of the solar cell, and allows light to hit the surface. We are going to use salt water as our other electrode, making contact with the whole surface of the thin film cell, yet conducting electricity. We are then going to immerse another copper wire to make the connection. You could equally use another piece of copper plate around the outside of the thin-film cell, but not touching our oxidized copper.

In a commercial thin-film cell, tin oxide is commonly used as the other electrode, as it is clear and yet conducts electricity.

Now take a piece of Perspex to act as a cover plate, and stick a strip of duct tape on either side.

We are going to stick our other electrode wire to this piece of Perspex.

Use thickish wire for clarity, with few actual zigzags so that you can clearly see what is going on. To optimize the performance of your solar cell, you want to make the conductor large. To this end, you are better using lots of thinner gauge wire in a much finer zigzag pattern - this will still allow the light to get through, but at the same time gives a large conductor area.

You can experiment with different types of wire and copper - the trick is to try and maximize the surface area of the copper, while trying to block as little light as possible from reaching the solar cell.

Fold the duct tape over and stick the wire to the plate.

We are now going to combine the electrode plate with the space. Again, duct tape makes this a nice easy job.

Next, we are going to take the copper plate, and stick duct tape to one side, with the sticky side of the tape facing the same direction as the layer of red copper oxide.

Combine the plate and the front module to make the finished solar cell.

Now, take a little salt water, and fill the void between the Perspex front section and the copper plate. Seal the module with duct tape all round to prevent leakage.

Lastly, connect your module to a multimeter, find a bright light source, and explore some of the electrical properties of your solar cell.

If you are interested to learn how to make a solar panel, visit us at:

<http://www.greenearth4energy.com>

You may want to get your solar panel installation guide here:

<http://www.earthenergyguide.com>

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