For Teachers **Recycling of silicon-based PV modules**

Module 1

Objective: Recycling of PV-based PV modules

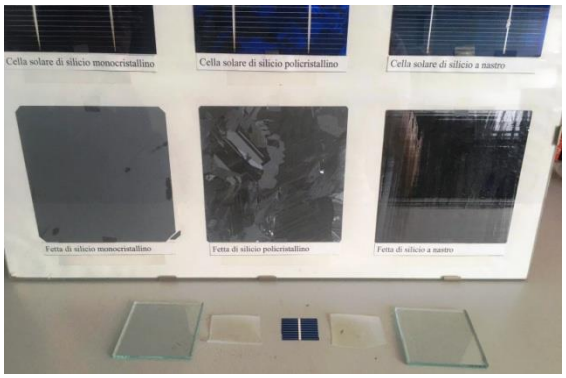
List of materials/tools

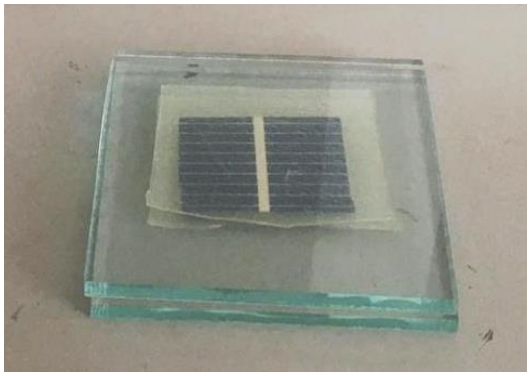
- Protection glasses and disposable gloves
- 1 domestic iron
- 1 wooden cutting board or 1 ceramic tile to be used as heat resistant support
- 2 heat resistant gloves for temperatures up to 250°C (for example: https://www.amazon.co.uk/Inkbird-Resistant-Grilling-Sillicone-Microwave/dp/B08GR1B2V1/ref=sr_1_1_sspa?dchild=1&keywords=heat+resistance+gloves&qid=1621443808&sr=8-1-spons&psc=1&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEzUk83MExKS09LQk80JmVuY3J5cHRlZElkPUEwMTgxNzAzM0UzNURXNzBXVFpSMSZlbmNyeXB0ZWRBZElkPUEwMDE2MjMwMUFHUDRTUVpDSUdGQiZ3aWRnZXROYW1lPXNwX2F0ZiZhY3Rpb249Y2xpY2tSZWRpcmVjdCZkb05vdExvZ0NsaWNrPXRydWU=)
- 2 glass slices, 2 EVA sheets and 1 silicon solar cells for each mini-module (these items of course are not available on the market, so please ask by email the RM ambassadors responsible for this toolkit and they'll send them to your school as soon as possible)

Procedure

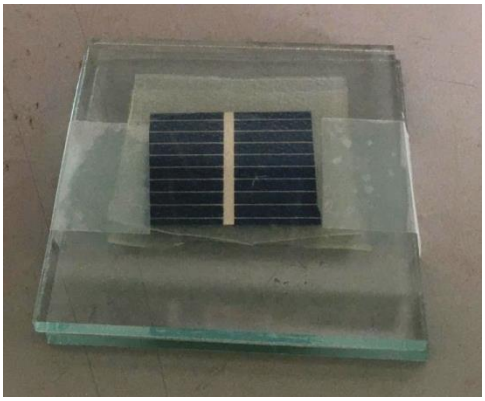
- Wear protection glasses and disposable gloves.
- Turn on the domestic flatiron and set a temperature compatible with wool, silk or synthetic textile, which usually is around 150°C. **PLEASE, PAY ATTENTION TO THE HOTPLATE because 150°C is a severe temperature for both your skin and for any furniture**.

- Stack the mini-module as follows. From the bottom to the top: 1 glass slice, 1 EVA sheet, 1 silicon solar cell, 1 EVA sheet, 1 glass slice (see the pictures below).





- Put a small strip of adhesive tape as reported in the pictures, in order to make the stack more compact:



WHOLE STACK

—— ADHESIVE TAPE

- Put the stack onto the heat resistant support, then carefully put the iron hotplate onto the mini-module stack (see the picture below). The iron must be kept in this way for about 20 minutes.

- Remove the iron, then wait at least 20 minutes to allow the mini-module to cool down to room temperature. **PLEASE, PAY ATTENTION TO THE HOT SURFACES!**

- Now the mini-module is assembled.

- When you want to start disassembling the mini-module, set the maximum iron temperature, which usually is around 250°C.

- Put once again the mini-module onto the heat resistant support, then put carefully the iron hotplate on it (see the picture below). The iron must be kept in this way for about 20 minutes.

- After 20 minutes the iron can be removed. For few moments after iron removal, the EVA softening induced by the just applied heat allows for a manual separation of the mini-module constituting parts (see picture below). **However, this step can be performed only wearing good heat resistant gloves (see "List of Materials" section), the mini-module temperature being around 250°C.**

Additional Safety Notes

In this experiment, high temperatures of 150°C and 250°C are used. Therefore, PLEASE, PAY ATTENTION TO THE HOTPLATE and IRON because 150°C and 250°C are severe temperatures for both your skin and any furniture. When handling with high temperature, always use good heat-resistant gloves.

Conclusions

A silicon-based PV panel can be assembled and disassembled thermically, permitting the recycling of the different materials composing the devices.