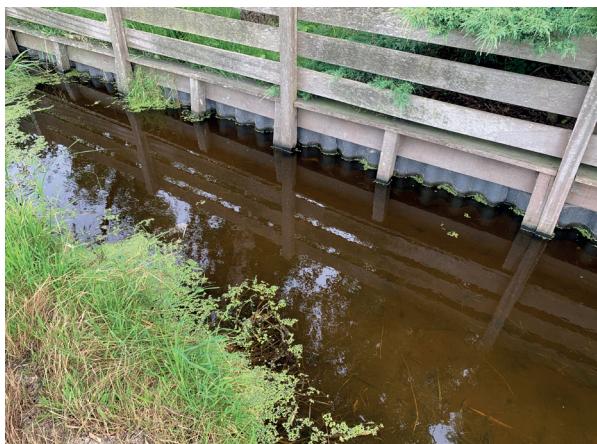


FIND THE RIGHT SOIL....

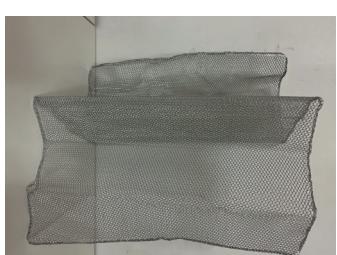
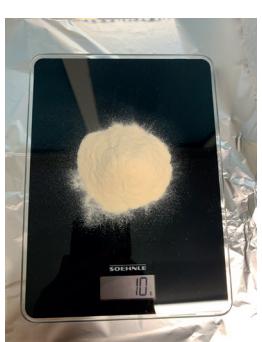
river beds and swamps (areas where water has a reddish color. preferably collect deep samples not from the surface)



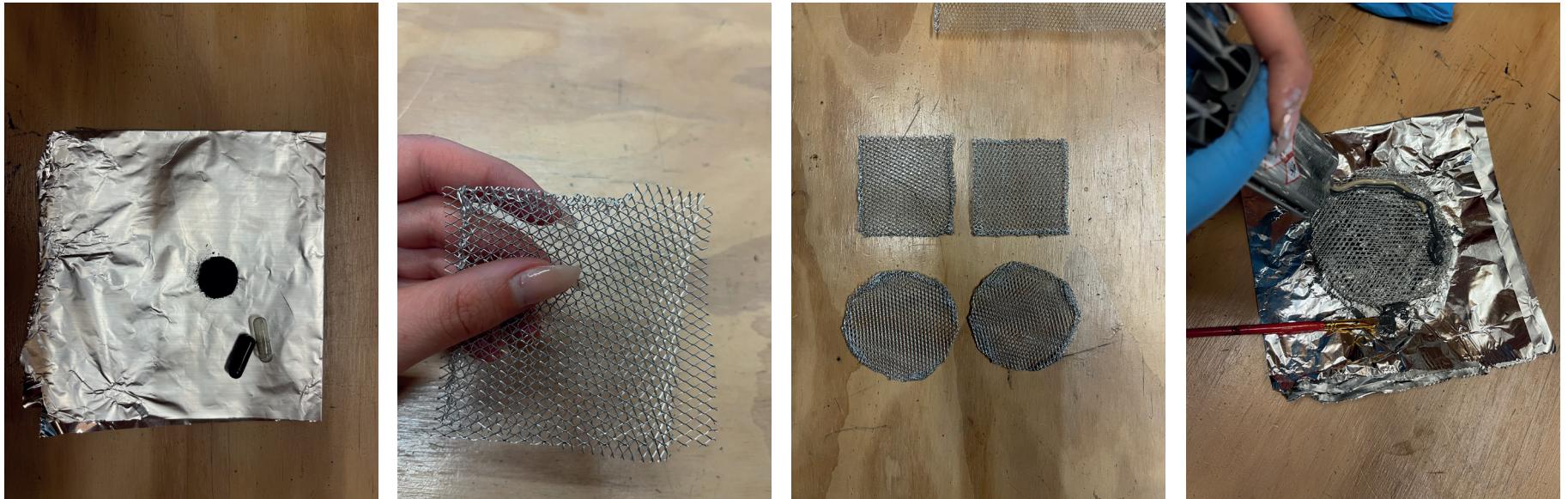
Materials and Tools



- Mud (samples should be collected in advance)
- Containers (ex: glass jar or plastic - Around 1L)
- Electric wires (Copper wires 30 cm - 2 wires are needed per battery)
- Stainless steel grids (To be cut in rectangles. per battery size 5*7 cm)
- Epoxy glue (Will be sent from Amsterdam)
- Active coal (Will be sent from Amsterdam)
- Agar (10 g is needed per battery)
- Salts substances (any broth powder - 1 pack)
- Led diodes (1,5-2,8 V) the lower the voltage the better
- Multimeter
- Pot, Stove & scale.
- Drinking Water
- liquids measuring cup.



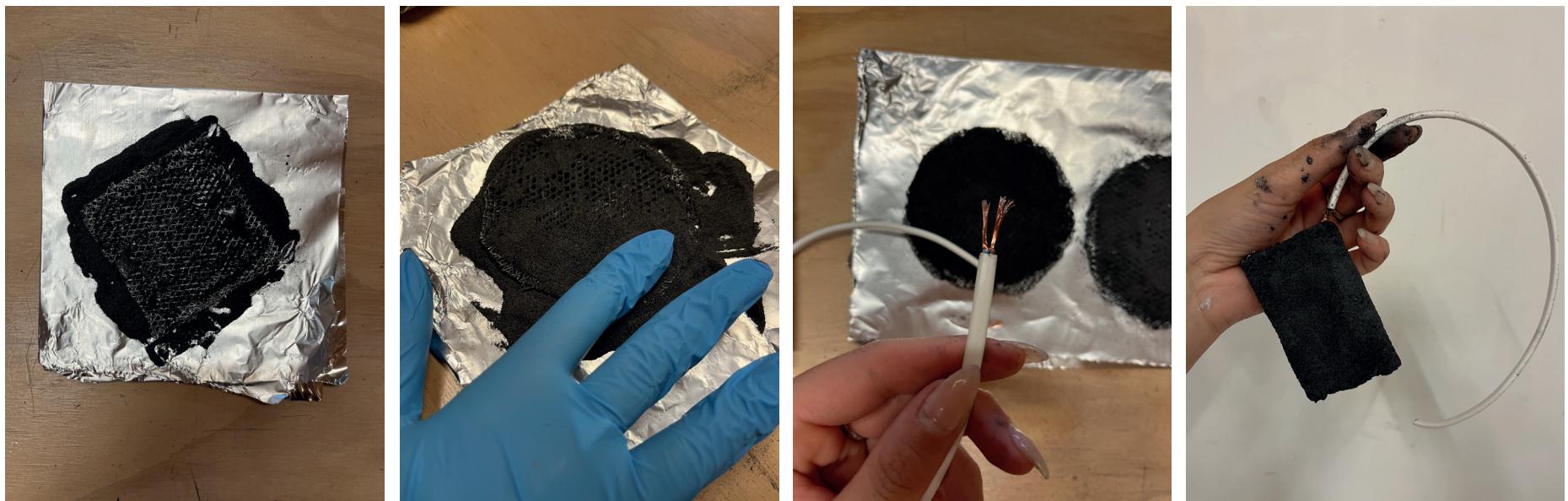
Process



1. Making the Cathodes:

To make the cathodes you need the active coal, epoxy glue, stainleass steel nets and the electric wires.

- First empty the pills of the active coal provided to get the powder out, and place it on a sheet. (about 10 pills powder per 1 cathode disc)
- Secoundly, cut the net in a circle or rectangular, and make it in two layers so it can hold the glue and coal well.
- Then brush the glue on the net and dip it in the coal. Make sure that you add enough glue and that you are pressing the coal well into the glue.
- After making sure that all the net is covered with glue and pressed with coal, connect the net from one of the sides to the electric wire.



1. Preparing first part of the Soil Battery:

For this step you need the container (glass jar), mud, the dried cathodes.

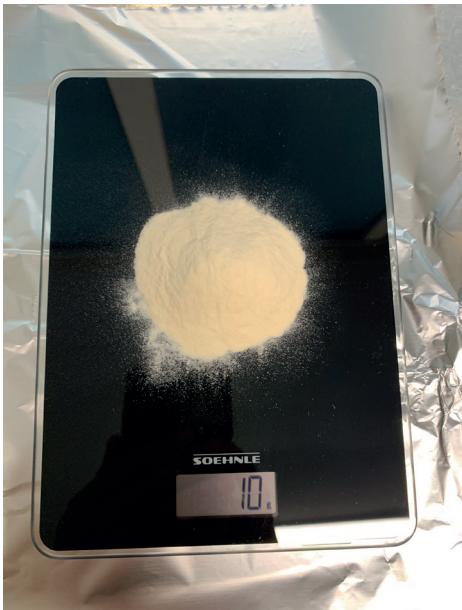
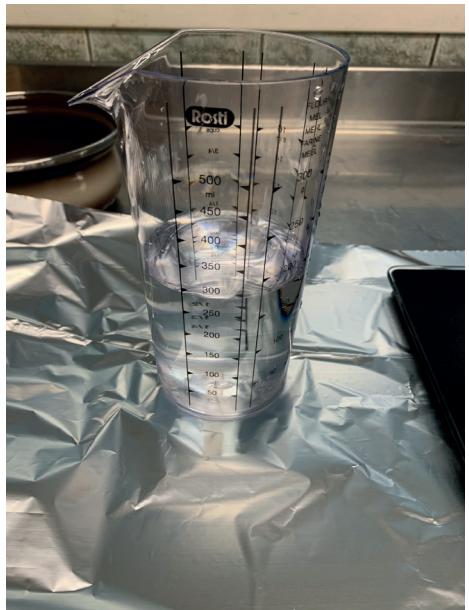
- First put the cathode in the container (make sure that the glue dried and the coal is stuck to it).
- Secondly, fill the jar with mud so it covers the cathode, keeping the wire out of the container.
- Then hit the container to get all the trapped air bubbles out. It is very important to release the air bubbles from the mud.



1. Making the proton exchange membrane:

Per battery: to make the membrane you need 10 gram Agar, 285ml water, 2gram broth, stove, and pan.

- First put the agar, broth and water in a pot on low temperature. keep on steeing the mix.
- wait 3 minutes after boiling, then turn off the fire.
- Wait until the temprature of the mixture goes down. When it cools down the mixture become harder until it's gelatine. That's why it's important too not wait untill it's cooled down completley.
- While the mix is still somehow warm and in a liquidy state. You pour the mixture in the jar over the soil. This is step must be done in 2 parts. First add half of the mix and make sure that the cathode wire is comung out from the middle. Wait 1 minute then add the second half, to make sure that the first layer hardens, stays over the soil and not mix with it. Also, make sure to keep the wire of the cathode in the center while the agar is hardening. This would be easier to follow the next steps.



- After pouring the agar in the jar. wait for 10 mins so the agar is completely hard and settled.
- Make sure the top part of the jar over the agar is clean from any mud. if not, you should clean it using a tissue. Make
- add water on top of the agar so it fills the jar.
- Final step, add in the water. Connect the end of the wire with the other end of the wire that is coming out of the mud.
- Measure the current with multimeter. Check the voltage and the amp.
- Re measure the current after an hour and see if it increases. It's always good to keep track.

Clean Water



Agar

Mud