# Electrolysis

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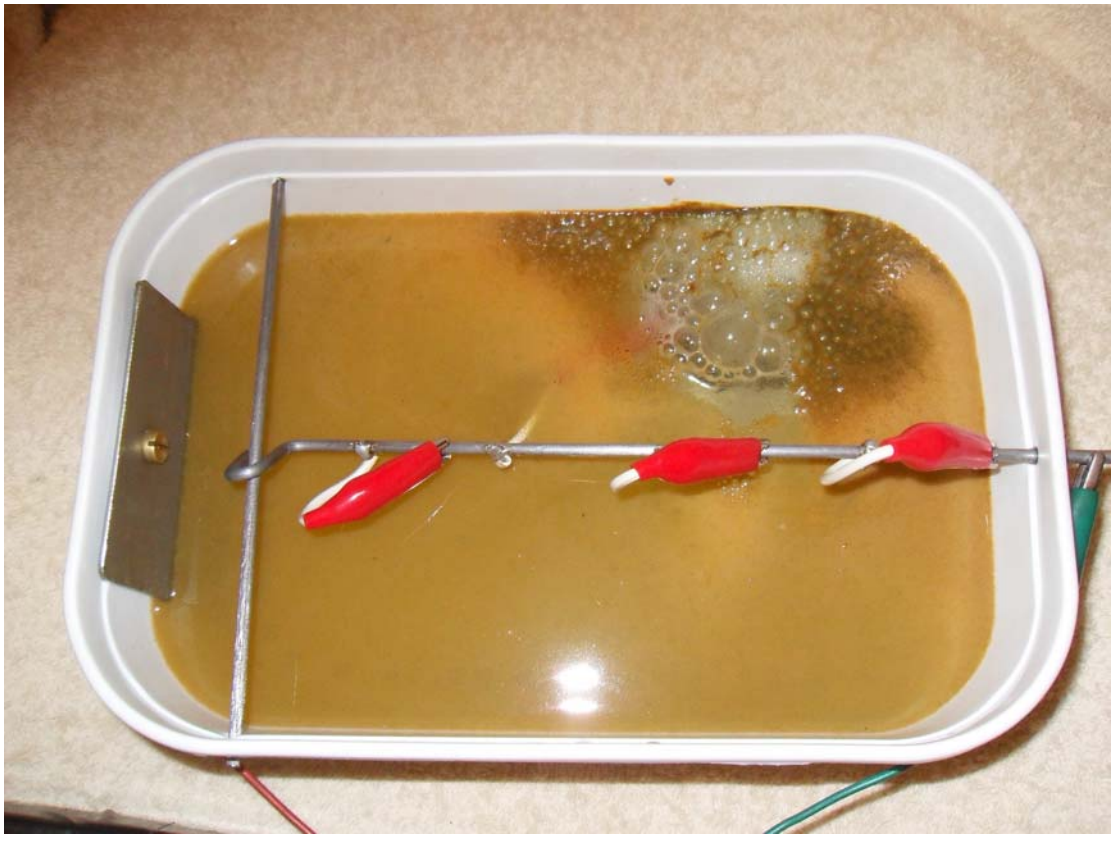
As a treasure hunter / detectorist one of the main jobs we have is the cleaning and preserving of our finds. Today I am going to be looking at just one of the ways in which we clean our relics, and that is Electrolysis. I have noticed on numerous forums that the question “How do we do electrolysis” always keeps coming up. What I am going to do today is to tell you what electrolysis is, and then what equipment is needed, and finally how to do electrolysis.

## What is Electrolysis?

Electrolysis is using an electric current that is passing through a solution of salt water, to remove the deposit that is left on the artifact being cleaned. Basically, this method is the reverse to electroplating. Instead of putting a coating onto the item, we change the polarity of the electricity to remove the deposit and fix the deposit onto the electrode, which is normally stainless steel.
In electroplating, you connect the positive terminal to the work to be plated, in electrolysis you place the negative onto the work to be cleaned.

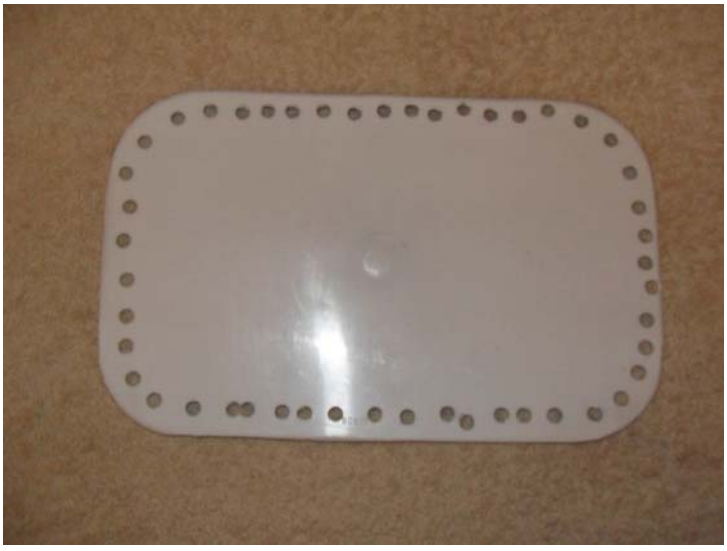


## What equipment is needed for electrolysis?

The equipment needed to do electrolysis is very basic and easy to obtain. The set-up that I am going to show you is made using an ice cream container, a stainless steel plate for the electrode, 2x welding rods for the hanger bar, crocodile clips to hold the work in the solution, and a 12v DC power supply.

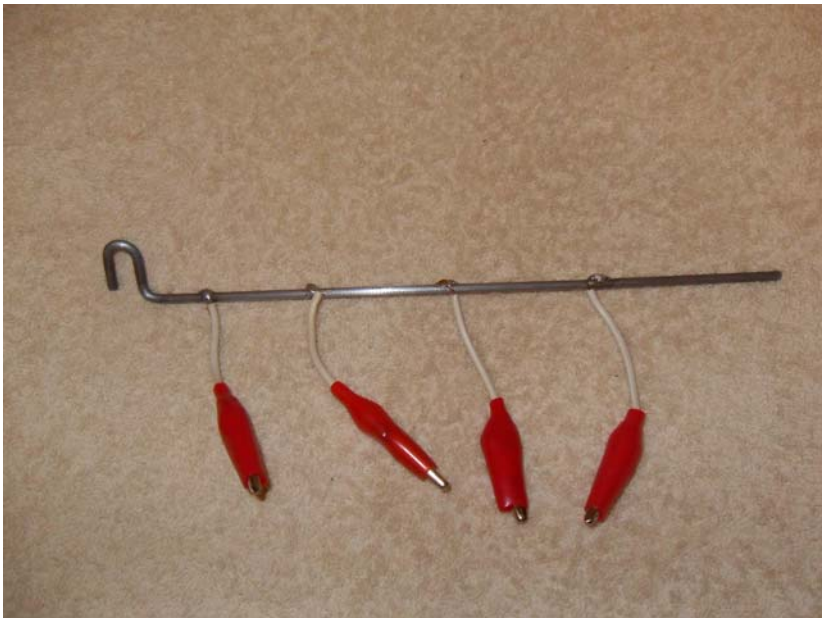
What I have done is to cut and bend the stainless steel plate to fit nicely into the ice cream container. I have attached the plate to the container using a 5mm brass bolt, this being the contact for the positive wire.
I then cut a welding rod after cleaning the flux off, to fit across the container, which will be used to hold the rail that holds the items to be cleaned.

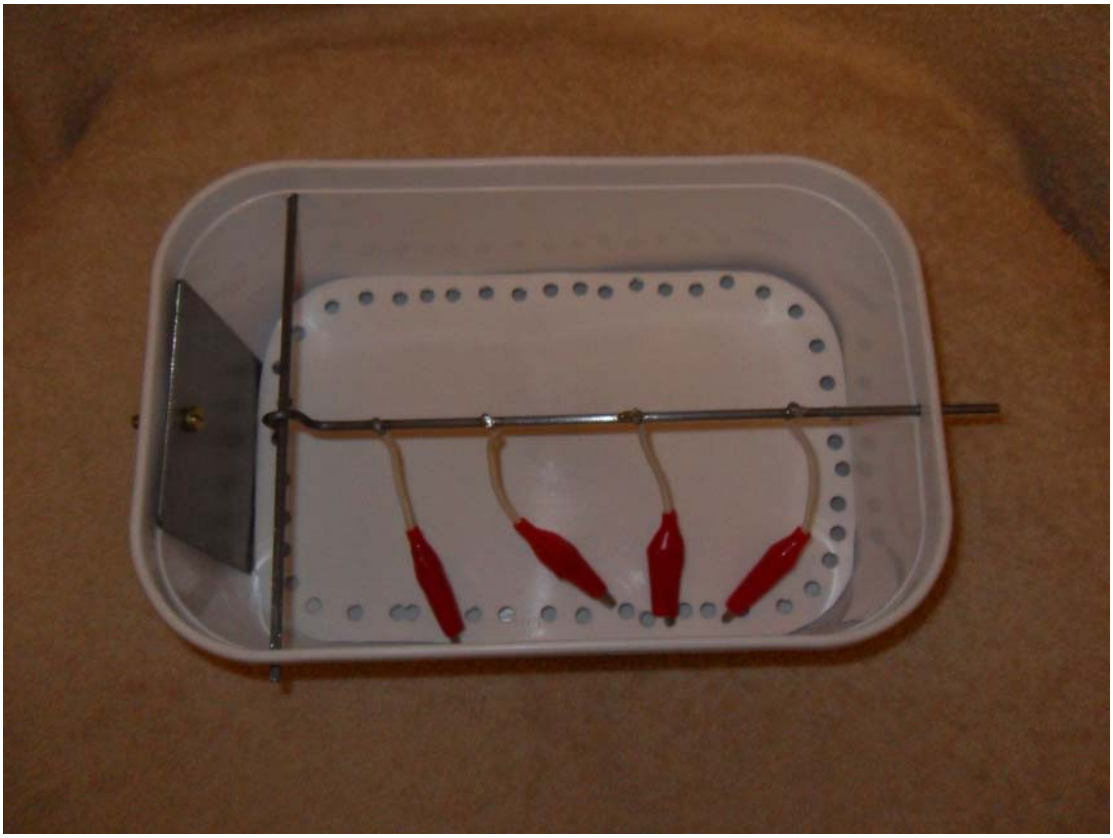
Using the lid from a 2nd ice cream container, I cut out a piece that will fit into the bottom of the main bath to isolate the artifact from the electrode. I placed holes around the outer edge to allow the water to flow better through. Using a tie twister (used to tie around plastic bags) to secure the plastic to the steel plate at the bottom to stop the plastic from floating up.



Always remember that the artifact cannot touch the electrode, as that will cause a dead short.

The next part of the project is the bar that holds the artifact in the solution. This bar is also the place to connect the negative wire to.
As can be seen in the next photo, I have bent the rod so that it sits nicely over the cross bar. This just keeps the rods from moving around.
I have also soldered onto this rod 4 crocodile clamps, which are used to hold the artifacts. If the items are coins, or something else that is small, and of the same material, I do clean more than one item at a time.

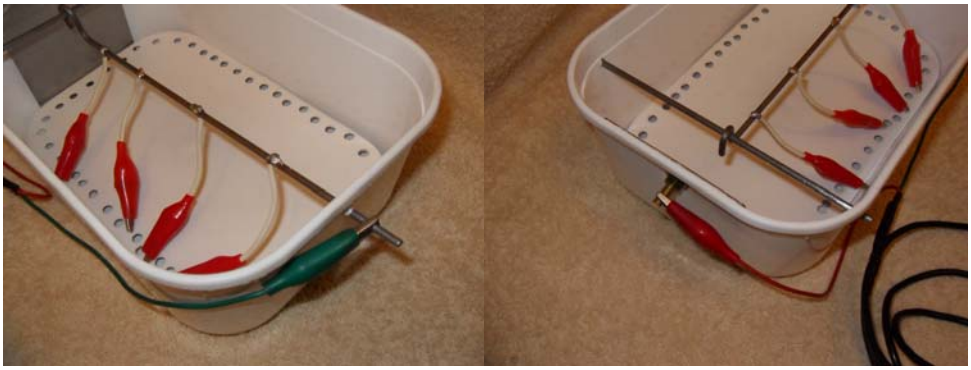




As can be seen from the photo above, the rod goes through the plastic at the end of the container so that the negative terminal of the power supply has something to hold onto.

The next part is the power supply. I use a 12volt 1amp power supply, which should be about the highest voltage and amperage to use. If you use to high amperage, you will burn the object being cleaned and do more damage than good. Also there is a heat that comes of the artifact being cleaned due to the amperage. You do not want to boil the object.

You have now completed building the electrolysis bath and are now ready to start using it.



As can be seen in the above photos. The negative terminal is connected to the clip bar, and the positive terminal to the electrode plate. Do not switch these two wires around, as you will be doing electroplating. The easiest way to see if they are connected properly is when you switch it on, the artifact will bubble…. If the plate bubbles, switch the wires around.

The Solution.

The solution for electrolysis is mainly made up of water and salt. What I do is place enough water in the container to cover the artifact, but still be below the hanger bar. If you are in an area that has lots of calcium or iron in the water, then use distilled water. I then add a teaspoon and a half of table salt to the water and mix. Generally, this mix is just fine. For stubborn cleaning, you can also add about 2 teaspoons of lemon juice, which being an acid, will just help to budge the grime.

Cleaning your artifact.

We are now ready to carry out the cleaning of your object. What I have done is taken a shoe heel protector that comes from a British Boer war site in South Africa. This artifact is made out of steel, and being over 100 years old, is very rusty.

All I have done is washed it in water to get all the loose stuff off like mud. As you can see from the photo, the artifact is very rusty; in fact rust has now formed in layers.
Now is the time to place the artifact in one of the clips, and to move the clip around a bit to get a good grip and contact with the steel. All the other clips I clip back onto the hanger bar to keep these out of the water. I then connect the power supply and switch on the power. Within a short moment, you should start seeing the bubbles coming off the artifact.

Now it is a game of patience, and careful watching. Every now and then, it pays to switch off the power supply and remove the artifact from the clip and wire brush it to get the loose rust off. If still not clean, put it back into the clip and switch on the power again.

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**Warning:** Remember that you are playing with electricity, do not put hands in the water while the power is on, if the amperage is a bit high, you will get shocked.
Also do not breathe in the fumes that comes off the water, this will irritate your throat. Carry out the cleaning in a well-ventilated place.

Keep an eye on the piece being cleaned, but it can take a few hours to make a big difference, all depending on the amount of rust to be removed. The water will change color, but keep it going till you are satisfied that the job has been completed.

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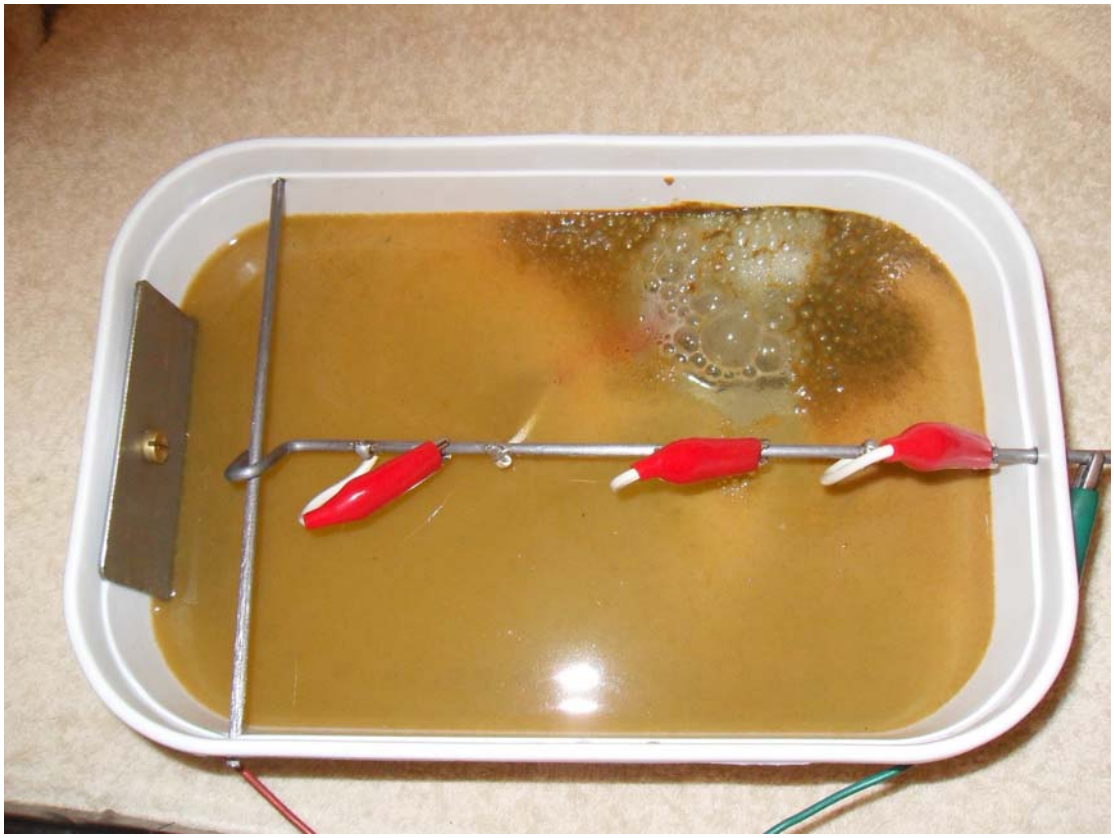
Electrolysis is also not meant for items of great value, as you will see, you can remove steel and rust from the item being cleaned, so be wise and work with care. I have used this method to clean horseshoes with great results, but have also damaged a coin to beyond recognition. Just make sure that the object being cleaned will survive this way of cleaning with good results, if not sure, use another way to clean your object.



In the above photo, my artifact had been cooking for about 25 minutes in the solution, and was nearly ready to remove from the bath.
When you have finished the cleaning, it is a good idea to wash the item in clean water or distilled water to remove any of the salt and deposits that have accumulated from the cleaning process. Dry off the artifact, and give it a coat of spray varnish, or a coat of candle wax that you can melt onto the artifact after heating the artifact over a gas flame. This coating will help to stop any future rusting.

If you look carefully at the above photo, you will see some of the steel shining through. You could do some more cleaning, right down to the bare metal, but I prefer to leave it slightly colored so that it still look old. If you give this item a brush with a wire brush, all the rust will be totally gone.

When you have finished, make sure you clean out the electrolysis bath and pack it away for another day.

I hope that this tutorial has given you some ideas on cleaning your artifacts? And also that some of the questions that you may have had about electrolysis, have been answered. I have used this system with great results, and trust that you too will have great results.

If you have any questions or comments or ideas, please feel free to go onto the forum at http:/petergill.webs.com and leave us a message under the “Restoration and Cleaning” section.