

# How to make a good a nano-coating on copper

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PHOTOS AND NOTES BY OLIVER PERCEVAL

This is my understanding of how to make a good a nano-coating of copper:

1. Use oxygen free electric copper if possible.
2. Have the surface of the copper shiny.
3. Clean the surface of the copper to be free of oxidation, oil, fingerprints etc, (you can use white vinegar and salt for this)

4. Choose a polypropylene plastic box with lid for the coating process.

5. Place on the bottom of the dry container caustic soda (NaOH) of high purity, mixed with some KOH or KCl salt. The presence of potassium (K) is important, as potassium contains 120 ppm (0.012%) of K40 isotope, which is subject to beta decay, and it helps to trigger the process. NOTE: I used to get good results with 40 grams of NaOH and 12-15 grams of KOH per litre of boiling water.



6. Place a zinc coated iron mesh (chicken wire) over the caustic, with purpose to create a distance between the bottom of the container and the pieces, which are to be nano-coated.

7. Position the copper pieces onto the chicken mesh. Alternatively, you may hang them on any kind of suitable support, which keeps them separated (not touching each other and not touching the bottom of the container). **It is not recommended to place them flat, horizontally. It is better to put them at an angle of at least 15° or even better at 90° to the bottom of the container (place them inclined or vertically).**



8. As a basic rule, do not stack the pieces of copper one over the other, and do not tamper them from here on. You have to minimize the contact with them (for example by holding them by the edges, with extreme care to not damage or crush the created nano-layers).

9. Prepare enough boiling water to be able to cover in an instant all the copper pieces.

10. Put the lid on the container, then move it slightly in order to crack-open just a corner of it, through which opening you will be able to pour the boiling water in. Avoid that the vapours reach your face and avoid breathing in the vapours. Use face and eye protection, gloves, protective equipment as described in the MSDS.



11. Pour the boiling water into the container and cover it with the lid immediately. You can place a weight over the lid if necessary in order to close it well. Leave it untouched for at least 48 hours, and better for one week.

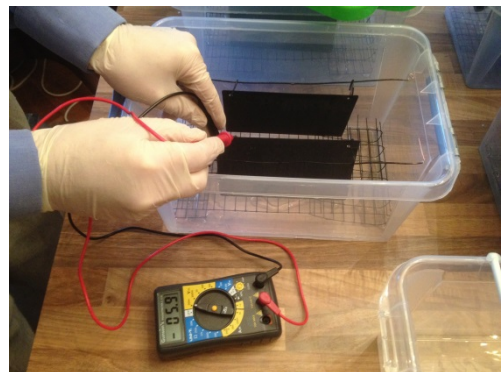
12. After 2-7 days passed, remove the lid and drain the liquid caustic from the container. Do not move the copper pieces, do not touch them, just remove the caustic liquid. You can use a flexible pipe for siphoning (similarly to how fish-tanks are emptied). *Note by Oliver Perceval: the plates shouldn't change colour whilst in the caustic, only once removed to develop in the closed tub.*



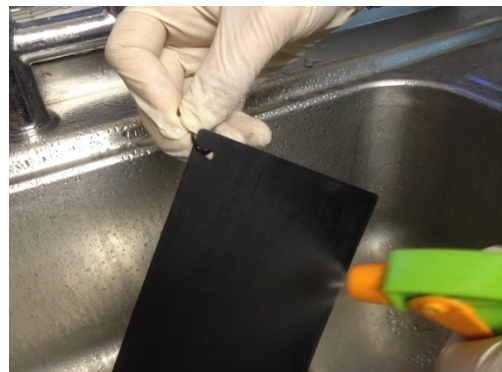
13. If possible, at this stage do not move the copper plates or wires into another container. Keep them in the same plastic container, in which the immersion in hot caustic was done. During the hot caustic process, the walls of that plastic container got nano-coated too, and inside there is a plasmatic environment. The nano-coated surface of the plastic container will better keep inside the created fields.

14. Leave a little liquid (about 1-3 ml) in the container in order to provide moisture.

15. Immediately after the removal of the liquid caustic, apply the probes of a multi-meter to two extremities of the copper pieces for about 5- 10 seconds, with purpose to polarize the surface and dictate a direction of the formation of the nano-structures. Optionally, you can repeat this 4-5 times a day, depending on purpose. In case of nano-coating wires or coils, apply the probes on the ends of the wires. In case of plates, it is preferable to apply on diagonally opposed corners of the plates.



16. Place back the lid on the top of the container, and leave it for minimum 2 weeks, and preferably for 2 months for the nano-layers to grow.



17. Optionally, you may do a second coating without immersion, but with steaming over caustic steam, followed again by polarizing and conditioning in the same way as after the immersion process. *(for steaming put new Caustic and KOH crystals on the bottom and pour boiling distilled water on top so that the vapours rise and suffuse the hanging plates)*

18. When you decide to end the process, do not immediately open the containers. First open a little crack for allow the moisture to evaporate gradually during a couple of days. The transition from moist environment to room environment has to be done gradually.

19. Once the process is done, rinse the nano-coated copper pieces with distilled water in order to remove the caustic from their surface. **Do not just spray, but immerse the copper pieces in pure water in at least three successive baths.**



20. Before use, keep the nano-coated pieces in closed boxes. And handle with great care and respect.

21. Hang the plates in the tub in readiness for the GANS making procedure. ☺☺☺