

Document LMEC001

Pine offers a kit (part number AKPOLISH) containing various polishing materials manufactured by Buehler, Ltd. ([www.buehler.com](http://www.buehler.com)).

This kit contains solutions of finely ground alumina compounds and polishing cloths that can be used to repolish an electrode.



There are as many different opinions about the best way to polish electrodes as there are electrochemists in the world. The following polishing advice comes from the machinists at Pine who made your electrode:

### **Routine Cleaning**

If you simply want to "touch up" the surface after a few uses of the electrode, you can repolish it with 0.05 micron alumina. This kind of "routine cleaning" can be performed on a daily basis.

- (1) Remove the backing and affix a piece of Buehler microcloth to a stiff flat surface (such as a sheet of glass).
- (2) Dispense a small slurry of 0.05 micron alumina solution on to the microcloth.
- (3) Polish the electrode against the slurry, keeping the electrode surface parallel to the surface of the cloth.
- (4) Clean the alumina particles off of the electrode using distilled water and gentle ultrasonication (if available).

### **Aggressive Cleaning**

A slightly more aggressive cleaning would involve polishing first with 1.0 micron alumina and then, after that, the 0.05 micron alumina. This type of cleaning will take a lot longer than a routine cleaning.

- (1) Remove the backing and affix a piece of Nylon polishing cloth to a stiff flat surface.
- (2) Dispense a small slurry of 1.0 micron alumina solution on to the Nylon polishing cloth.
- (3) Polish the electrode against the slurry, keeping the electrode surface parallel to the surface of the cloth.
- (4) Clean the alumina particles off of the electrode using distilled water and gentle ultrasonication (if available).
- (5) Perform a Routine Cleaning with 0.05 micron alumina (as described above).

### **Complete Repolish**

This is a very time consuming and labor intensive process, and Pine DOES NOT RECOMMEND a complete repolish unless major damage has been suffered by the electrode. You may want to consider sending such an electrode back to Pine for evaluation and possible repair.

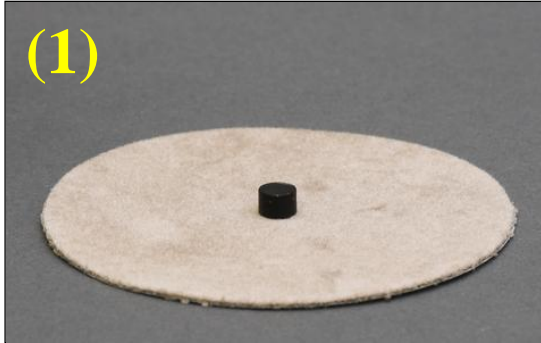
- (1) Remove the backing and affix a piece of 600 grit sandpaper to a stiff flat surface.
- (2) Polish the electrode against the sandpaper, keeping the electrode surface parallel to the sandpaper surface.
- (3) Clean the alumina particles off of the electrode using distilled water and gentle ultrasonication (if available).
- (4) Perform an Aggressive Cleaning with 1.0 micron alumina (as described above).

Each Complete Repolish of an electrode greatly reduces the useful lifetime of the electrode because it removes a significant amount of the precious metal from the surface of the electrode. A Complete Repolish removes anywhere from 250 to 500 micrometers of material from the surface of the disk. You can usually perform 7 to 15 Complete Repolish operations before you hit stainless steel and/or silver conductive epoxy. Once you hit steel or silver epoxy, your voltammetry will begin to be very strange, and its time to throw away the electrode. This is the ultimate fate of all electrodes.

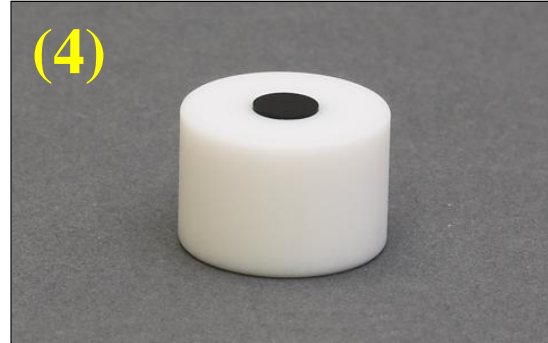
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## ChangeDisk Inserts

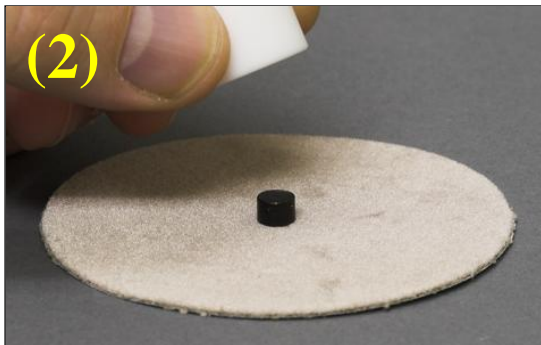
Pine offers RDE and RRDE tips which permit the disk material to be removed from the electrode tip. For these types of tips, it is often preferable to remove the disk material and polish it separately. Pine offers special tools for removing and polishing these disk inserts. These photos illustrate the polishing method.



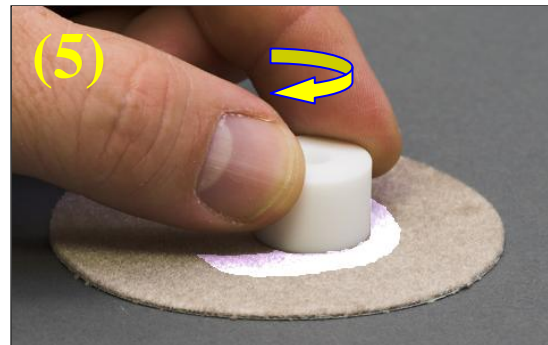
(1) Place disk insert on clean polishing cloth with polished face downwards.



(4) The disk insert is now ready to be polished using a slurry of alumina paste.



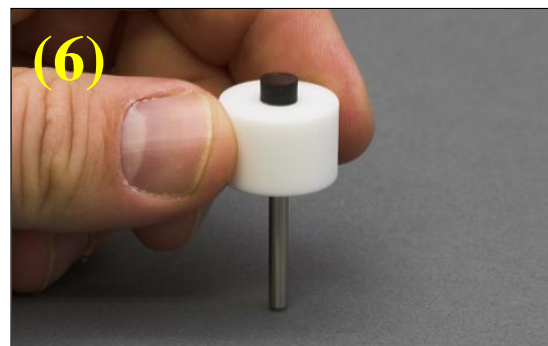
(2) Gently bring Teflon disk holder down on to the disk insert.



(5) Polish the disk against the alumina slurry using a circular motion while pressing firmly.



(3) Carefully push Teflon holder down until disk and holder surfaces are flush.



(6) After polishing, clean disk thoroughly and eject it from the holder using the push rod.