

Microelectrodes *No. 04-00003-00005, No. 04-00007-00010 & No. 04-00017*

Thank you for choosing a Sensolytics microelectrode.

All our microelectrodes are previously polished, and the diameter has been determined by cyclic voltammetry. However, we recommend mechanical cleaning by polishing using slurries of different particle sizes on polishing cloths or specialized polishing papers like available in our Sensolytics polishing kit prior to each use. Common polishing materials are alumina, diamond or silicon dioxide and are applicable also for Sensolytics microelectrodes. After polishing, rinse the electrode alternately with isopropanol (or ethanol, acetone) and distilled water to remove any particles.

Additionally, gold microelectrodes are electrochemically cleaned afterwards by means of cyclic voltammetry in 0.5 M H₂SO₄ in a potential range from 0 V to 1.7 V vs. Ag/AgCl (3 M KCl) with a scan rate of 0.2 V/s (10-50 cycles).

Subsequent to the cleaning, the active electrode surface needs to be characterized again by means of cyclic voltammetry using a free-diffusing, reversible redox mediator. The CV of a cleaned microelectrode should show a sigmoidal shape with a stable diffusion-controlled current. The diffusion-limited current i_{∞} is proportional to the size of the electrode and is therefore a valuable measure of the active surface area. The following equation describes the correlation between diffusion-controlled current and the radius of the active electrode surface:

$$i_{\infty} = 4 n F D c r$$

n = number of transferred electrons, *F* = Faraday's constant, *D* = diffusion coefficient of the redox species, *c* = bulk concentration of the redox species, *r* = radius of the electrode [cm]*

The copper wire is covered with an insulating polymer. The insulation is removed at the very end of the wire. *Please use only this part for connection with the potentiostat.* Clean this area with a rough emery paper (e.g. P400) as required. Please pay attention to hold the electrode at the copper wire and not at the glass body to avoid traction to the connection between copper and noble metal wire while cleaning the contact.

* Please refer also to e.g. Bard, A. J.; Mirkin, M. V. Scanning electrochemical microscopy, 2nd ed.; CRC Press: Boca Raton, Florida, 2012, p 3 for further information.