Microelectrodes *No. 04-000011 - 04-00012*

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 of each electrode prior to each use. After polishing, rinse the electrode alternately with isopropanol (or ethanol, acetone) and distilled water to remove any particles.

In order to fabricate microelectrodes with diameters < 10 µm, assemblies of platinum wire melted inside a glass capillary are pulled using a laser-based pulling procedure. This method leads to disk-shaped electrodes with diameters down to the nanometer range. Subsequent grinding of the pulled electrodes is performed until diameters of ~1 µm and ~5 µm are reached, respectively. As a result, the actual size after polishing of the microelectrode needs to be characterized again via cyclic voltammetry using a free-diffusing, reversible redox mediator.

The diffusion-limited current i_∞ is proportional to the size of the electrode. In order to calculate the radius of the characterized electrode, the diffusion-controlled current measured by CV and the following equation are used:

$$i_\infty = 4\,nFDcr$$

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. In order to clean the copper connection, use a rough emery paper. 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.*