Carbon fiber Electrode - 5μm

Model # ALA CFE-2

Ver. 2.0
2. 2017

ALA Scientific Instruments Inc. | 60 Marine Street, Farmingdale, NY 11735
Voice: +1 631.393.6401 fax: +1 631.393.6407
www.alascience.com support@alascience.com

ALA Scientific Instruments Inc. | 60 Marine Street, Farmingdale, NY 11735
Voice: +1 631.393.6401 fax: +1 631.393.6407
www.alascience.com support@alascience.com

Limited Warranty Information

Every effort is made to insure a high quality, reliable product. However, since CFE's are delicate, many circumstances beyond our control may damage or break them before they reach the user. "Damage" shall be limited to the following conditions:

1) Any defect that disrupts electrical connectivity between cut electrode surface and pin at electrode base.
2) Failure or absence of parylene coating on fiber.
3) Excessive noise (RMS> 30pA).
4) Excessive baseline current.

ALA Scientific will replace any damaged electrodes upon your next order, or will issue a credit toward your next purchase of electrodes, whichever your prefer.

Your claim cannot be honored if it is filed more than 90 days following the date of invoicing.

In some cases we may need to examine the damaged electrodes before a replacement or credit is given. When requesting a credit from ALA Scientific directly, please provide the lot number and the date of manufacture that are indicated on the shipping package. Please note if the package indicates signs of external damage, as this may indicate evidence of mishandling by the shipper. For sales outside the US, check with your particular representative for credit information.

Breakage of the electrode while under use is not covered under warranty.

ALA Scientific Instruments Inc. | 60 Marine Street, Farmingdale, NY 11735
Voice: +1 631.393.6401 fax: +1 631.393.6407
www.alascience.com support@alascience.com

For more information about these electrodes, and related products such as carbon fiber electrode holders, amplifiers, signal conditioners, data acquisition hardware and software, and manipulators, please contact ALA Scientific Instruments or your local distributor.

ALA Scientific Instruments Inc. | 60 Marine Street, Farmingdale, NY 11735
Voice: +1 631.393.6401 fax: +1 631.393.6407
www.alascience.com support@alascience.com

Carbon Fiber Electrode Use and Re-use Guide

Upon receipt, please check your electrodes for damage that may have occurred in transit. Although damage may be visible to the unaided eye, it is best to examine electrodes with a microscope or magnifying glass. The electrode consists of three main parts, including the glass capillary, the coated carbon fiber, and the copper tubing. The highly inert, parylene that coats the electrode may form areas of variable thickness. These deviations in thickness are not a cause of concern. The manufacturing process may leave irregularities in the tip of the carbon fiber. These are also not a cause for concern. However, the delicate connection between the copper tubing and carbon fiber is essential to functioning of the electrode. Should visible damage be present here, or should any other defects be visible, please notify your distributor, or ALA Scientific, immediately. Warranty information is available on the page that follows.

One of the key features of this product is that the fibers may be cut back several times for repeated use. Each cut exposes a carbon disc that is surrounded by insulating parylene. The cutting procedure is very simple and is illustrated below. It is important to follow the suggested procedure carefully, because the electrical connections in the electrode may be damaged, if the electrode is not properly supported during fiber cutting. Because in an uncut electrode the parylene covers the entire surface, the electrode must be cut before the first use. It is also essential to re-cut the surface prior to each experiment to ensure a clean surface. The electrodes are shipped with long fibers to enable the maximal number of usages. If the fiber appears to bend upon contact with solution, and if this bending impedes access to the preparation, it is acceptable to cut back a sufficient length of fiber to ensure greater stability.

Materials required for cutting the fibers are as follows: One surgical knife with an unused #10 blade (the curvature of the #10 blade is important), one standard glass slide, modeling clay, scotch tape, and a stereoscope. Place two dollops of modeling clay on the glass slide. Dollop ‘A’ is should be about twice the size of ‘B.’ A small piece of Scotch tape should be applied a short distance from Dollop B. The purpose of positioning the clay dollops and the tape is so that the electrode can be

ALA Scientific Instruments Inc. | 60 Marine Street, Farmingdale, NY 11735
Voice: +1 631.393.6401 fax: +1 631.393.6407
www.alascience.com support@alascience.com

laid across the slide with the delicate fiber resting on the tape, allowing the tape to provide a suitable substrate for cutting the fiber. After carefully positioning the electrode, cut the fiber by rolling the blade over the fiber, using the taper of the blade as a guide. Cutting off any portion of the fiber tip will expose a suitable disk for redox chemistry; cutting off as short a section as possible ensures maximal reuse of the fiber. Do not cut the fiber with a back and forth motion. The fiber may be re-cut until the Sylgard area is reached, providing several experiments for each electrode.

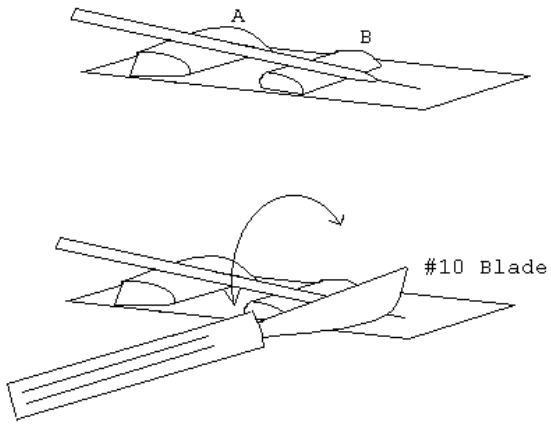


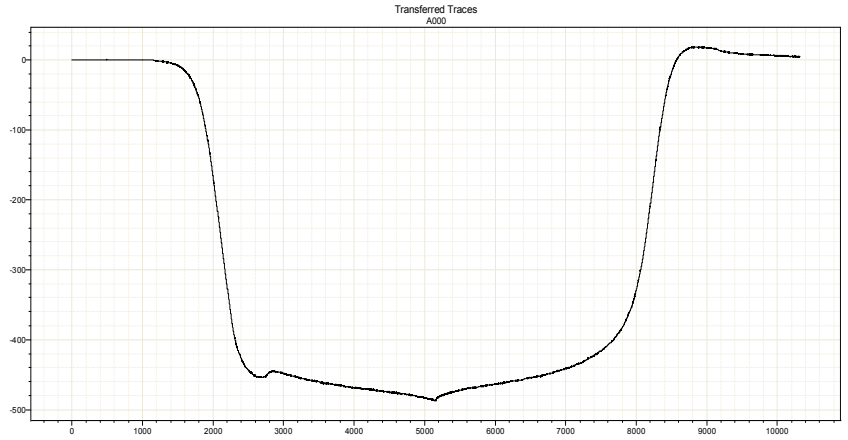
Figure 1. Proper positioning of fiber and method of cutting.

To connect the electrode to an amplifier, the copper tubing may be inserted into a standard female BNC connector. Should this prove not to be mechanically stable, please consult your distributor or the factory for a holder suitable for your amplifier. A wire can also be soldered to the copper tubing, if necessary, and the copper tubing can be crimped slightly to expand the diameter.

Testing of electrodes prior to use.

Cutting of electrodes produces exposed carbon disks of different shapes and sizes. To ensure that an appropriate area of carbon is exposed and that the cutting procedure did not disrupt the electrical contact between fiber and copper tubing, it is recommended that each electrode be tested for appropriate response under oxidizing or reducing conditions. The section below, adapted from Schulte, A. & Chow, R.H. (1996) A Simple Method for Insulating Carbon-Fiber Microelectrodes Using Anodic Electrophoretic *Deposition of Paint*. *Analyt. Chem.* **68**: 3054-3058, describes an appropriate procedure using cyclic voltammetry with the electrode immersed in Hanks' buffered saline solution.

Trimmed CFE-2 in physiological saline held at +650 mV



Activation procedure

Users may find better results by first activating the electrodes. One activation procedure is as follows: Expose the electrode to +700mV at 10hz or whatever frequency you would use for your data acquisition for about 1 minute. Do not use negative current and do not use an acidic solution. Neutral ACSF works very well as an activating solution.

ALA Scientific Instruments Inc. | 60 Marine Street, Farmingdale, NY 11735
Voice: +1 631.393.6401 fax: +1 631.393.6407
www.alascience.com support@alascience.com