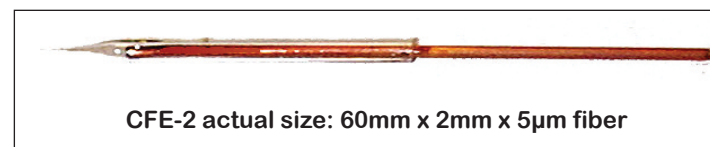


CFE-2 5µm

VA-10X

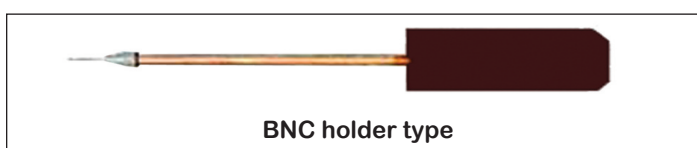
Cyclic voltammetry and amperometry are indispensable techniques for the study of neurotransmitter release. They can be used to identify neurotransmitters or to determine the kinetics of release from single vesicles.

Selection of electrodes is critical for effective use of this technique. Constructing your own is tedious and demanding. Our CFE electrodes are made through parylene coating which creates the highly sensitive environment for the detection of these small signals of interest.

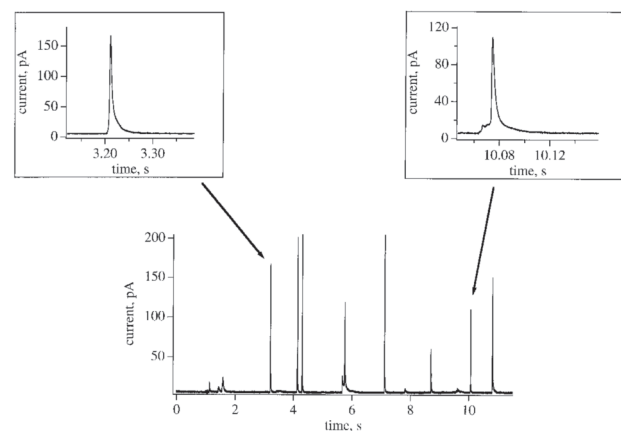


CFE electrodes offer the following advantages:

- 5µm OD carbon fibers suitable for recording from small cells
- Electrode holders for all major commercial amplifiers ensures stable connection
- Dielectric properties of coating enable low-noise recording
- Tips easily re-cut for multiple re-uses
- Electrodes shaped to fit under water-immersion objectives
- Proven performance in numerous widely-cited studies
- Direct connection to headstages



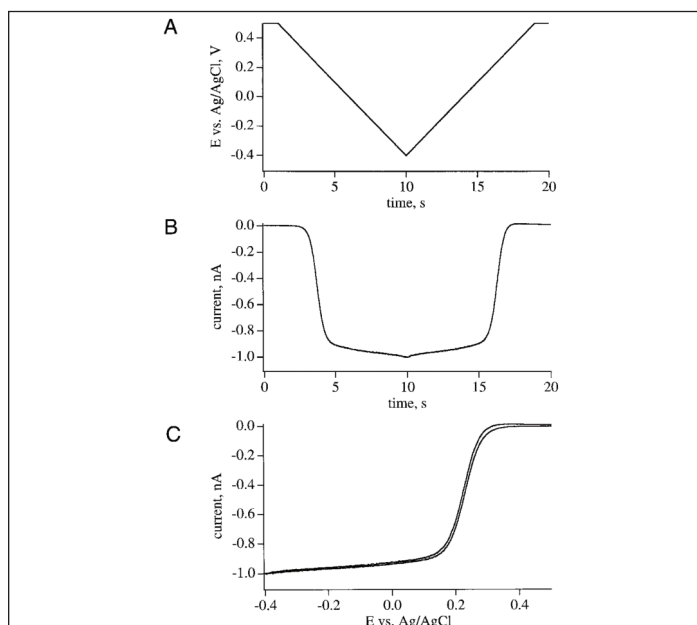
Amperometric events at high resolution; the right figure shows a prespike ("foot") feature, due to escape of transmitter out of an early, not fully expanded fusion pore.



Amperometric recording of adrenaline release from an isolated bovine chromaffin cell. Detection of amperometric spikes, the quantal responses due to single-vesicle exocytosis, was performed with an EDP insulated 5µm OD CFE-2 held at +800mV vs Ag/AgCl.

Select References:

- Chih-Tien Wang, Jihong Bai, Payne Y. Chang, Edwin R. Chapman and Meyer B. Jackson, *Synaptotagmin-Ca²⁺ triggers two sequential steps in regulated exocytosis in rat PC12 cells: fusion pore opening and fusion pore dilation*, J Physiol 570.2 (2006) pp 295-307
- Liang-Wei Gong, Gilbert Di Paolo, Ester Diaz, Gianluca Cestra, Maria-Elena Diaz, Manfred Lindau, Pietro De Camilli, and Derek Toomre, *Phosphatidylinositol phosphate kinase type 1 regulates dynamics of large dense-core vesicle fusion*, PNAS April 5, 2005, vol. 102, no. 14, 5204-5209
- Xue Han, Chih-Tien Wang, Jihong Bai, Edwin R. Chapman, and Meyer B. Jackson, *Transmembrane Segments of Syntaxin Line the Fusion Pore of Ca²⁺-Triggered Exocytosis*, Science Vol. 304 , 289-292, 9 April 2004
- A. Schulte and R. Chow, *A simple method for insulating carbon-fiber microelectrodes using anodic electrophoretic deposition of paint*, Analytical Chemistry 1996, 68, 3054-3058



Cyclic voltammogram (CV) for the reduction of 1mM ferricyanide measured at a parylene coated 5µm OD CFE-2. (Scan rate 100mV/s; electrolyte: 0.5M KCl @ pH 3)

Ordering Information:

ALA CFE-2	Carbon Fiber Electrodes - pack of 10 - 5µm OD fibers
ALA CFE-H-AXU	CFE Electrode Holder for Axon Universal Amplifiers
ALA CFE-H-BNC	CFE Electrode Holder for EPC/BNC Amplifiers (e.g. EPC-10)

Voltammetry and amperometry are powerful, sensitive techniques for the study of the release of oxidizable transmitters from cells or single vesicles. Patch clamp amplifiers that perform these techniques include

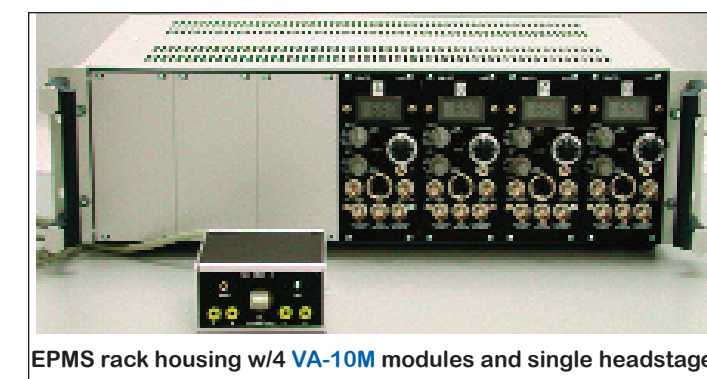
many expensive features that are not required. npielectronic's VA-10X series amplifiers offers all of the essential features in a compact and inexpensive unit.

VA-10X Features:

- Two or three electrode headstage for floating command potential
- Standard current range: ±20nA with 500MΩ feedback resistor - feedback resistors from 1MΩ to 10GΩ available
- Frequency booster for signals up to several kHz
- Low noise electronics for recording release of single vesicles
- Seven (VA-10X) or six (VA-10M) gain settings to record signals of varying amplitudes
- Sixteen (VA-10X) or six (VA-10M) step low-pass Bessel filter (4-pole or 8-pole)
- Command potential set internally (ten-turn control) or externally
- Two current outputs (filtered and unfiltered)
- Telegraph outputs (gain, filter, command) for easy interfacing to data acquisition systems
- Digital meter for command potential



For complete VA-10X specifications go to ALA's web site or www.npielectronic.com



VA-10X Ordering information

npi VA-10X-4	Voltammeter / Amperometer Amplifier with 4 pole Bessel low pass filter - 19" Rack Mount
npi VA-10X-8	Voltammeter / Amperometer Amplifier with 8 pole Bessel low pass filter - 19" Rack Mount
npi EPMS-7	19" Rack Mount Chassis - Holds up to 7 modules w/power supply
npi VA-10-M	Voltammeter / Amperometer module for EPMS system
npi VA-10FB	Frequency booster for VA-10X system