



AFCTR3 Kit

Graphite Counter Electrode
Product Guide

Part #: AFCTR3

Warnings



CAUTION:

The graphite rod is long and brittle. If too much torque is applied on one end of the rod it can break.

Additionally, the graphite rod is semi-permeable and should be thoroughly rinsed, soaked and cleaned between different experiments to minimize contamination.



Chemical Compatibility:

Alkaline solutions can attack the borosilicate in the fritted glass tube.

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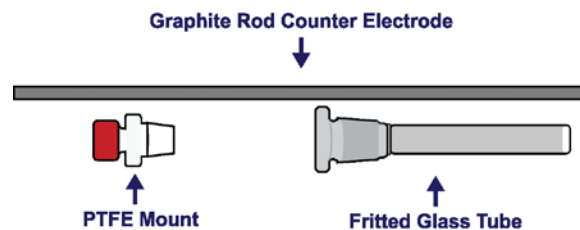
DRP10103 / REV001 (JUN 2017)

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Description

The **Graphite Rod Counter Electrode** (Pine Part #: MPGRR250) is available as a kit (Pine Part #: AFCTR3). It is intended for use in electrochemical systems and usually employed as one of three electrodes present within the electrochemical cell.

As shown below, the AFCTR3 Graphite Rod Counter Electrode Kit consists of the **Graphite Rod Counter Electrode**, **PTFE Mount** (Pine Part #: RRP036K3), and **Fritted Glass Tube** (Pine Part #: RRP032).



Graphite, a fairly inert material, acts as a good sink for current passage across the solution to the working electrode. The Graphite Rod Counter Electrode features a large surface area (~124 cm² in total). In general, the counter electrode should have a surface area that is at least 10x larger than the surface area of the working electrode to ensure that the half reaction occurring at the working electrode is not rate limited by the half reaction occurring at the counter electrode. The Graphite Rod Counter Electrode can be used in aqueous and non-aqueous systems.

The **PTFE Mount** (PTFE = polytetrafluoroethylene) has a 1/4" ID to fit the Graphite Rod Counter Electrode and a male 14/20 joint for adaptation. The male joint on the cap fits snugly into the female 14/20 joint of the **Fritted Glass Tube**. The fritted glass tube for the graphite rod features a medium frit and a 24/25 taper joint that is compatible with the OpenTop Corrosion Cell (e.g., Pine Part #: AFCELL8U). The fritted glass tube is often used when experiments have reactions that produce unwanted species or gases at the counter electrode. It serves to isolate these byproducts from the bulk solution by creating a diffusional barrier. When using the fritted glass tube, avoid alkaline solutions as they can attack the borosilicate in the tube.

Photograph



Assembling the Kit

The Graphite Rod Counter Electrode Kit can be used with or without the Fritted Glass Isolation Tube. To use the fritted glass tube and to connect to a 24/25 port, slide the PTFE Mount over one end of the Graphite Rod Counter Electrode. Loosely tighten the red cap near the top of the electrode. Fill the fritted glass tube with electrolyte solution and then submerge the other end of the graphite rod into the tube's solution until it reaches a desirable height (~5 mm above the glass frit). Slide the 14/20 joint of the PTFE mount toward the 14/20 joint of the fritted glass tube. Tighten the red cap fully. Be sure to place the ensemble into solution.



Note:

Before using the electrode with a potentiostat, ensure that electrolyte solution is both inside and outside of the fritted glass isolation tube.

Alternatively, the graphite rod may be removed from the glass tube and mounted directly in the electrochemical cell through a 14/20 side port.

Maintenance

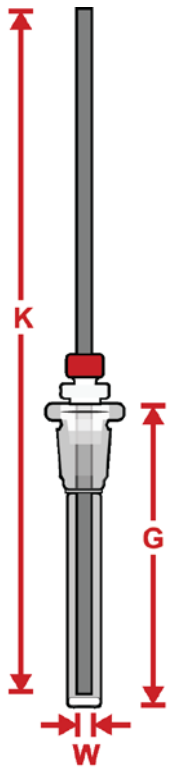
After every use, rinse the graphite rod with solvent to remove any dissolved chemicals. For aqueous systems, rinse thoroughly with deionized water. To minimize crystallization within the glass frit, be sure to thoroughly rinse both sides of the frit.

Storage

Store the graphite rod in a dry location. Dependent upon use, it is good practice to soak and store the frit in solvent to prevent chemical contamination of future experiments.

Potentiostat Connection

Diagram



Note:

The back screw of the alligator clip limits how wide the alligator clip can open. The back screw might have to be loosened in order for the graphite rod to fit in the alligator clip.

Graphite Rod Length
(K): 12"

Graphite Rod OD (W): 0.250"

Fritted Tube Length
(G): 5.5"