

TECHNIQUES FOR CHLORIDING SILVER WIRES

Before using Ag wires as current electrodes, they must be chlorided. New (previously unused) wire should first be cleaned with ETOH before continuing, while previously chlorided wire should have the old chloride coating removed. A simple method to remove the chloride coating from silver wire is to quickly pass the wire through a flame. A properly flamed wire will be bright silver in color. As with a new wire, clean with ETOH before proceeding to remove finger oils.

Two methods are commonly used to chloride Ag wire; soaking a clean wire in household bleach or electroplating a clean wire using a voltage source. Both methods are described below.

- A) Soaking in bleach - Simply immerse the wire in full strength common household bleach (Clorox) for 15 to 30 minutes until a purple-gray color is observed. Rinse and use.
- B) Electroplating - Electroplating a silver wire with chloride is achieved by making the wire positive with respect to a solution containing NaCl (0.9%) or KCl (3M) and passing a current through the electrode at a rate of 1 mA/cm² of surface area for 10-15 seconds or until adequately plated (a 1 cm length of 1 mm diameter wire will require approximately 0.3 mA). The color of a well plated wire should be purple-gray. Periodic reversal of the polarity while plating the electrode tends to yield a more stable electrode.

When electroplating a previously plated wire, you may find that it does not plate evenly. Complete removal of the residual silver chloride is usually necessary to effect a uniform coat. Before making the wire positive to the chloriding solution, reverse the polarity for 5 to 10 seconds to remove any remaining chloride that might be left in pits on the wire. Then proceed as described above.

Chlorided wire should be monitored over time for degradation during use. This will usually be apparent as either a change in color or an increased drift in the junction potential, or both. Degraded electrodes should be replated using the above described procedures.

Ag/AgCl Reference Electrode. Cut a piece of silver wire (length ca. 6–7 cm, ϕ ca. 0.5 mm). Dip about $\frac{1}{2}$ of the wire into a FeCl₃ solution and hold it there for approximately 30 s. The wire in the solution turns dark gray as silver chloride is deposited on its surface. Rinse the wire with distilled water before use.

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