

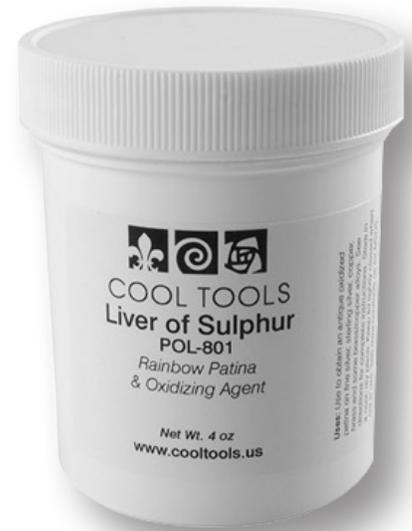
## Getting Started with Liver of Sulfur

Create beautiful rainbow patinas and oxidized finishes on fine silver, sterling silver, bronze, copper and copper alloys by brushing or dipping articles in a solution of liver of sulfur.

Effective on: Fine silver, sterling silver, and copper-bearing metals  
Results: Rainbow colors to black oxidized patina

### Procedure

Clean the metal, then dip it in a solution of liver of sulfur to oxidize, then dip in a neutralizing bath, complete by drying and polishing.



Tools Needed			
Small plastic container with lid for patina solution	Tongs, tweezers, plastic mesh basket or wire	Ammonia, household non-sudsy	Latex gloves
Small plastic or glass container for cleaning solution	Small spoon or popsicle stick	Liquid dish soap	Polishing supplies
Small plastic or glass container for neutralizing water bath	Toothbrush	Baking Soda	

### 1. Clean the Metal

To remove all traces of polishing residues, oils and fingerprints from the metal make a bowl of warm soapy water with a splash of ammonia added. (1 cup of warm water, 1/2 teaspoon of liquid dish soap, 1 Tablespoon ammonia. All these measurements can be estimated. ) Cleaning the metal is easiest when done at a sink. Dip a toothbrush in the cleaning solution and brush the entire piece. Rinse in clean water and place on paper towels to dry. Do not touch the piece with your bare fingers from here on out to avoid re-contaminating it with fingerprints that will resist the patina.

### 2. Preparing Solutions

Neutralizing Bath: Mix 1 teaspoon baking soda with 1 cup of water and stir to dissolve.

Patina Solution: Mix 1 cup of very hot water (just below boiling) with 1 small lump of Liver of Sulfur (pea size) and stir to dissolve. The color should be yellow to dark yellow.

### 3. Patina Your Metal

Hold your article using tweezers or tongs, or place it in a basket or strainer, or suspend it on a scrap of wire strung through a bail or other hole. Dip into the liver of sulfur solution and then remove, holding it above the solution to drain. Watch as the colors develop. This may happen slowly or quickly. The colors you get depend completely upon the temperature of your solution, the temperature of the metal and the length of time the item is kept in the solution. It's best to dip repeatedly if you wish to have a very dark patina. Continue dipping until you have achieved the colors you are happy with, then soak in the neutralizing bath the stop the process. The hotter the solution and the item, the quicker the colors will develop. The solution can also be painted directly on the metal. Hold the article in your gloved hand and apply the solution with a paint brush. Once you have achieved the colors you desire allow the piece to soak in the neutralizing bath for several minutes to be sure the sulfur has been completely neutralized. Then remove from the bath, rinse and dry on paper towels.

To highlight textured areas, shine up the high spots on your metal using a fine abrasive such as 400 grit 3M polishing papers, a 3M Microfine Sponge sanding pad, a Pro-Polish pad, or other abrasive to remove the oxidation from the high spots on the metal.



## COOL TOOLS

A traditional method is to rub the metal with a paste of baking soda or pumace and water. Use a large pinch of baking soda or pumace. Mix with a sprinkle of water in the palm of your hand. Thumbs make especially good tools for rubbing away just the right amount of oxidation.

If you desire a mirror finish on the high spots, first polish off the unwanted patina with any one of the abrasives previously. Then, polish again using the next finest grit, repeating with successively finer grits until a mirror polish has been achieved. After polishing, clean and buff with a polishing cloth.

### Tip

A video on achieving a mirror finish can be viewed on our website at [cooltools.us](http://cooltools.us) in our Learning Center.

Beautiful, iridescent colors are possible, especially with the addition of a little ammonia to the liver of sulfur solution. As beautiful as these colors are, they are not permanent. Over time, these colors will eventually turn dark grey. The time it takes for this process to occur depends completely on conditions in your area. Smog, salt water, heat, sunlight and chemical exposure of the metal can greatly speed oxidation. It is possible preserve the patina for a time with Renaissance Wax. Note: This will also change the saturation of the colors permanently and it will still continue to tarnish as all silver does, but much more slowly.

### Gemstones

All cubic zirconia, lab and glass stones are unharmed by liver of sulfur. Any natural gemstone that can be fired in place is safe in liver of sulfur. Do not allow liver of sulfur to contact turquoise, lapis, shells, pearls or other soft stones as they can be permanently stained. Set these types of stones after all patination is complete.

### Options

- Add 1 Tablespoon ammonia to the Liver of Sulfur solution for brighter colors
- Heat the article to be patinated to speed up the process. This is especially helpful when you want a very dark grey.
- Mix the Liver of Sulfur solution in luke-warm water to slow the process down and get better color control.
- Brush the solution onto your article instead of dipping to avoid patinating areas that you do not want colored.
- Brushing the solution onto your article while it is horizontal will give a different result than brushing it on while it is vertical.
- Dipping into solution and then draining vertically will give you a different result than if you drain horizontally.

### Patina Removal

If you are not happy with the results of your patina, you can remove it by pickling your article for a few minutes in Silver Prep or a sodium bisulfate pickle. If the item is fine silver, it can be placed in the kiln at 1000°F for about 5 minutes, or fired for a few seconds with a torch. The patina can be removed and re-applied indefinitely so long as no embedded materials limit the process.

### Shelf Life

Liver of sulfur degrades very quickly when exposed to light and air, and especially when mixed with water. Once mixed into solution, the sulfur begins to break down. Make a cup at a time for most applications to avoid wasting the material. Keep the lid on the liver of sulfur jar to preserve freshness. Store liver of sulfur in a cool, dark location with the lid tightly closed, and away from pets and children.



## COOL TOOLS

### **Disposal**

Degraded Liver of Sulfur looks creamy yellow, a lot like egg drop soup. Once it begins to pale in color and become opaque it will lose its effectiveness and will no longer perform. The degradation will happen anywhere from an hour to several hours after mixing, depending on conditions. Once the solution is degraded, its safe to dispose of by diluting and pouring down a drain.

### **Safety**

Work in a well ventilated area. Liver of sulfur, when mixed into solution, emits a distinctive rotten egg odor. This odor is not harmful in small amounts and as long as the solution is not burned. Avoid breathing the fumes directly. Use in a well ventilated area. Do not boil. Boiling or burning emits toxic fumes. See MSDS online for further safety precautions.