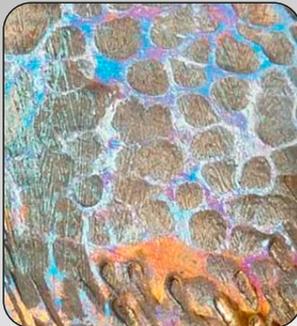
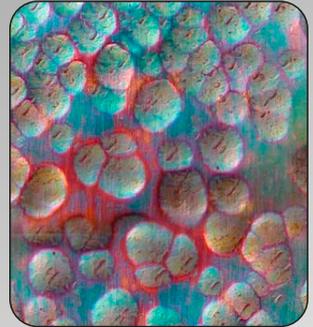




# NEW METALS TECHNOLOGY I CREATIVE SILVER MODELLING



## PROJECT SIX APPLYING PATINAS TO SILVER



# Surface finishing with Liver of Sulphur

“Liver of Sulphur” (Sometimes Referred to as LOS) is another term for the chemical compound Potassium Sulphide ( $K_2S$ ).

## Safety Warning



Liver of Sulphur is a highly toxic substance in its concentrated form and represents inhalation, ingestion and contact hazards. The heavily diluted compound used for jewellery surface finishing is safe to handle and use in a well-ventilated area, however you should not ingest the solution and remember to wash your hands thoroughly after using it. It must not be allowed to come in contact with acids as a toxic gas is rapidly evolved.

Potassium sulphides have traditionally been used to darken or 'antique' silver and bronzes. This is usually called 'oxidizing' the surface though it has nothing to do with oxygen, rather this is the name for a particular chemical reaction, what is really happening is that sulphur is reacting with the surface to produce colours, greys and blacks. Most people who make jewellery are quite familiar with its use.



Before dipping your pieces into the LOS solution they must be clean. A fast and easy way to remove all of the grease and fingerprints is by mixing Bicarbonate of Soda with water and rubbing the resulting paste thoroughly over the piece to be sulphurised which will produce a clean enough surface to proceed. The piece must then be well rinsed.

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Just adding a couple of drops of the concentrated liver of sulphur liquid to an amount of water (sufficient to cover the piece being sulphurised) in a small glass or plastic bowl is enough to get started. Repeated dippings and rinsing, help to build up to the desired colours on the surface.

When adding the LOS to water the fumes are strong and pungent so make sure to be in a well ventilated area. Using small amounts poses no health risk and, once mixed, it can even be kept for a few days to a few months if sealed tight in an air tight jar and kept in the dark. The diluted solution It loses colour quickly and decomposes with exposure to light and air so try to always keep it in a dark place and sealed tightly away from air.

To obtain a good black surface, a number of repeated applications alternated with rinsing is effective. A lustrous blue-black to steel gray may be produced on silver this way. Painting with the solution on specific areas with a paintbrush, accompanied by heating the object gently also works well. The paintbrush must never be used for anything else after use with LOS as, even if well washed, the residue from the LOS will cause further discolouration on future pieces.

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The first time, most people tend to use too much concentrated LOS liquid and make the solution too strong. Only mix up, as much liquid solution as you need to just cover your object, more is wasteful. Put hot water into the glass or plastic container and add only a few drops of the LOS. Then heat the object to be sulphurised either under hot running water, “au Bain Marie”, or sit it on a heating surface (like the top of the kiln).

Then dip it in the solution for a moment or two, take it out, and rinse in very cold water to stop the reaction. Repeat the process until the darkness you want is achieved. By going slowly you have a lot more choice in colour, tone and surface qualities. Make sure not to dip from the cold water into the hot as this will immediately cool down the heated solution and render it useless.

**Remember the solution should be hot and the piece to be sulphurised also needs to be hot to get the desired effect.**

When dipping slowly the colours you will be likely to see include Bronze/Gold (yellow), Magenta (reddish brown), Purple, Green, Blue and finally Black. Some people add a small amount of household ammonia to the solution claiming it intensifies the lovely blue-green-red-purple interference colours one gets when using a dilute solution and slow approach. These pretty colours are not very stable over time because they continue to react with sulphur in the air and eventually darken. You can sometimes 'save' them by spraying an appropriate lacquer over them. They may be retained if the surface is properly sealed. It is usually best to continue darkening to the greys and darks which will last indefinitely.

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Ammonium Sulphide (used as a garden spray) is supposed to work as an alternative to liver of sulphur. Egg yolks may also be used as an alternative oxidising agent.

# Applying a Patina onto Art Clay Silver

## First Step - Cleaning and Polishing

- (1) Wash with baking soda or use rotary cleaner. Rinse with distilled vinegar or distilled water.
- (2) Dry the silver pieces and burnish it. Next step highly shine the silver pieces with polishing cloth.
- (3) Mask the areas that do not need to patina. Use masking pen or permanent black marker pen. Use nail polish remover to remove the mask after sulphurising.
- (4) String the piece to a wire for dipping into LOS if necessary.

## Second Step - Prepare the followings:

- (1) 1 bowl of hot water with two or three drops of LOS and stir. Add one table spoon of ammonia to enhance the vibrant colours especially the blue colour. Add one quarter teaspoon of salt with ammonia to produce solid colours especially the green colour (optional).
- (2) 1 bowl of ice-cold water to retard the reaction process. Add Baking Soda as a neutralising agent (optional).
- (3) Heat up the silver pieces on a hot plate, hair dryer etc. Pieces with stone setting warm up with very hot water only.

### **Third Step - Sulphurising (Patina)**

- (1) Dip the silver into the LOS solution using the wire or tweezers. If both the mixture and the silver piece are very hot, the reaction is almost instantaneous. It takes only 2 seconds to turn jet-black.
- (2) Remove it from the solution, look at the progression. Check for the colour that you want. As you hold the piece, the colour will continue to develop.
- (3) Repeat the process several times and alternate with rinsing. It is effective until the desired colour is achieved.
- (4) Dip it in the ice-cold water for several minutes so that the LOS is completely neutralised.
- (5) Shading the patina by using a butane torch, over a stove, brushing or baking soda by rubbing the area with the fingers will give a different shade on the area.

### **Fourth Step - Other methods**

- (1) To achieve an iridescent patina, the solution should be lukewarm. It is easier to control but it takes a longer time to achieve the result.
- (2) The manner the item is dipped will also have a different effect. The colours will be streaked if it is dipped sideways. If the item is dipped obverse down, more vibrant colours will appear there than on the reverse side.
- (3) Using a paint brush, soft-sponge, cotton cloth or sawdust may result in unique effects.
- (4) You can also add shine to some parts of the patina area by rubbing with a burnisher or using a polishing cloth to remove some colours and still retaining the shine on the particular spot.
- (5) If you happen to dislike the finishing, the patina can be easily reversed by heating the piece over a stove with open fire or a butane torch until it turns white.  
Each time after the reversal, the piece has to be cleaned again and polished.



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