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## Make Your Own Colloidal Silver - Multiple Methods

### Basic and Powerful method by Steve Cox

I discovered a simple addition that makes everything else fall neatly into place for the Alternative Medicine Research Foundation's original colloidal silver generator design: Saran Wrap!

Placing Saran Wrap over the top of the container and poking it down into the water in the middle prevents over-spray from reaching the clips and has the additional benefit of limiting open air contact during the electrolytic process. With the addition of this final piece to the puzzle, I believe we have a completed colloidal silver generator design that guarantees consistent results with no undesired side-processes occurring.

A picture is worth a thousand words, as they say, so I have prepared five images, labeled with explanations and instructions as necessary. I think you'll find the overview pictures below especially useful in making all this clear to the potential builder.



I bought two 1 oz. solid silver bars from a coin dealer. They are marked Nemo's and stamped .999 FINE SILVER. These bars cost me about \$13 for both, including tax.



Here's how I bent the silver bars so they would fit on the side of the vase I use to make our colloidal silver.



Here's what the silver bar looks like when it's properly bent and placed on my colloidal silver generator.



Using Saran Wrap to cover the top of the container prevents moisture from reaching the clips and becoming part of the electrolytic process

Using Saran Wrap to cover the top of the container prevents moisture from reaching the

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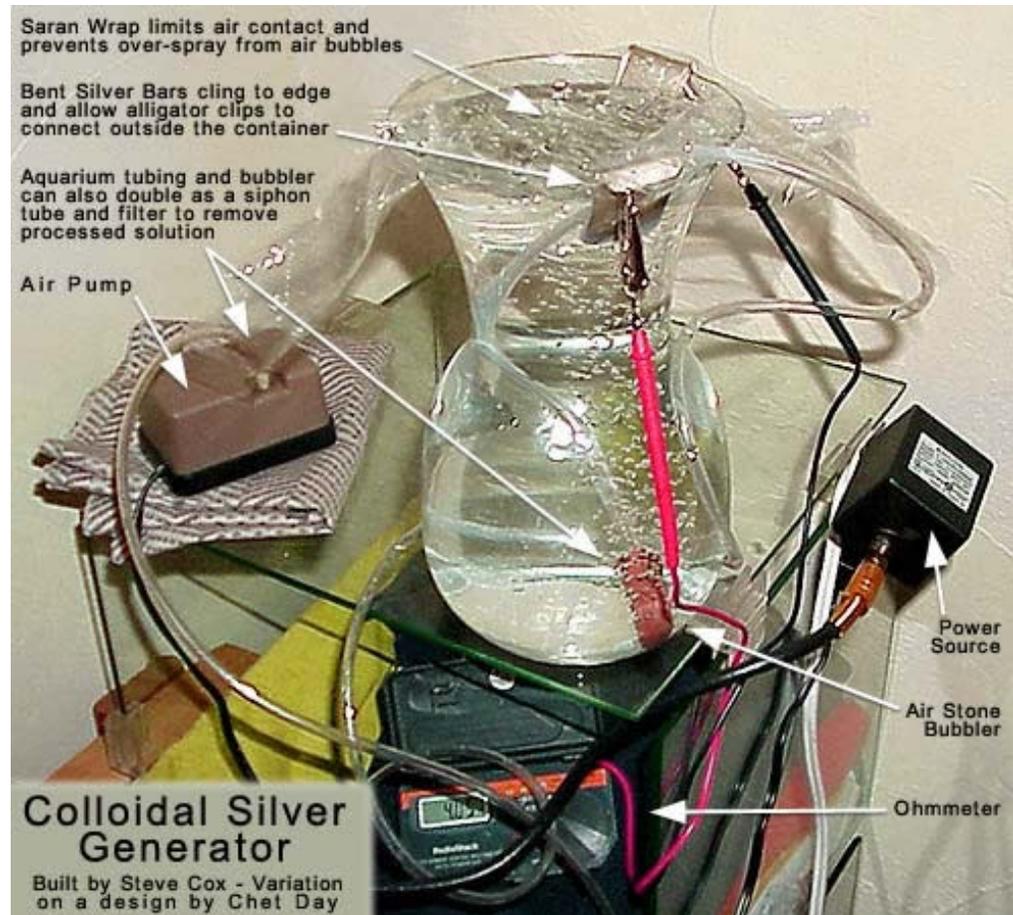
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clips and thus becoming part of the electrolytic process. This simple addition assures you of pure colloidal silver.



Here's a complete overview of Steve Cox's variation of the Colloidal Silver Generator first developed by The Alternative Medicine Research Foundation.

### Simple and Powerful Method by Dr. Jon Brooks

1. Buy a 6 volt DC transformer for about 5 clams. Better yet, pick up one at a flea market for fifty cents. The current doesn't matter as this method uses less than one ma. Regarding the size of the little wall transformer, Radio Shack has 300 ma. and 800 ma. The maximum current our process uses is 1/2 ma. so any will do just fine. We are beginning to receive many reports of efficacy for all kinds of problems. There is no down side risk in these concentrations. One can use four 1.5 volt flashlight batteries in series. They will last a long time.
2. Clip the connector off the end of the wire.
3. Get two alligator clips from Radio Shack for a buck.
4. Carefully separate the two wires. Strip the insulation off for about 1 inch.
5. Connect each lead to the clip.
6. You need two electrodes. Don't waste \$15.00 for 1/4 oz. pieces of silver wire. Go to a any coin store and buy two Canadian Maple Leafs for about \$6.50 ea. Each has 1.2 oz. of .9999 pure silver, enough to make more CS than you will ever use.
7. Buy a gallon of distilled water for about seventy cents.
8. Buy a tiny fish tank bubbler machine for about eight bucks. They will have the neoprene tubing as well. You will need about two feet.
9. Be sure the coin is squeaky clean. Clamp them to opposite sides of an 8 oz. glass of

- distilled water.
10. Place the tubing to the bottom of the glass.
  11. Fill the glass with distilled water ONLY up to the bottom of the clips. One does not want the metal, from the clips, in contact with the water, only the coins.
  12. Plug in the little transformer and oxygenation machine.
  13. Run for about five hours.
  14. Carefully remove the coins. There will be residue on them and you don't want that in the solution. For even more purity, use the neoprene tubing and siphon the solution into a clean glass/or plastic container. (In these parts a siphon hose is referred to as an "Arkansas credit card".)
  15. Keep the CS out of sunlight in an air tight bottle.
  16. Clean the coins thoroughly preparing for the next batch.

### **Low Voltage Colloidal Silver Generator with Mechanical Stirring**

These are some of the best instructions I have seen to build a colloidal silver production vessel. I found them on a long forgotten website and they have served in good stead in my quest to produce high quality low voltage direct current (LVDC) colloidal silver. The design incorporates "Ole Bob's" concept of constant stirring. Use whatever your chosen power source is to generate the CS ie: 3 - 9 volt batteries, wall wart, etc.

#### **Materials:**

- 1 each Wide Mouth Quart Mason Jar
- 1 each Plastic Wide Mouth Lid (from a Miracle Whip jar or from Ball or Kerr)
- 1 each 0-5 milliamp DC Gauge ( good one is the Shurite #8302Z ) or multimeter if you have one
- 1 each RS ( Radio Shack ) 1.5-3.0 Volt DC Motor ( P/N 273-223 ).
- 1 each 2-3 inch piece of wire insulation stripped off of a piece of 14 gauge electrical wire
- 2 each RS 75 ohm Chassis Mount TV Coax Connectors (P/N 278-212)
- 1 each RS "D" Cell Battery Holder ( P/N 270-403A ) to power the stirring motor
- 1 each RS Mini-Volume Control Potentiometer ( P/N 271-215B ) to control the speed of the stirring motor
- 1 pkg RS 14" Jumper Leads Pkg of 10 (P/N 278-1156C) to connect everything
- 3 each 9 volt alkaline batteries ( if that's what you want to use to power it )
- 2 each .999 or .9999 12 or 14 gauge silver electrodes. Keep them at least 3/4 inch away from the bottom of the jar (vessel)
- 2 each RS 9 Volt Battery snap connectors to connect to the batteries.

Install the 2 Chassis Mount TV Coax Connectors in the lid so that the electrodes are about 1 to 1 1/4 inch apart (sort of off to one side of the top of the lid -- remember you also need room for the stirring motor).

Install the Stirring Motor in the lid ( I used hot glue gun ) so that a 2 inch or so piece of wire insulation, off of a piece of 14 gauge electrical wire, can stir freely without hitting the electrodes. It will take trial and error to determine where to place the Motor and how long to make the stirrer ( the stirrer slides conveniently right onto the shaft of the RS motor ).

You now have your version of a CS Production Vessel.

Use the Jumper leads to attach the "D" Cell battery holder with battery ( put the potentiometer in the circuit to control the speed of the stirring ) to the two connections on the stirring motor. You are now the proud owner of a working CS stirrer!!

Use more Jumper leads to attach the Power Source ( 3-9 volt batteries ) to the two electrodes. Include the 0-5 DC milliamp gauge or a multimeter into the circuit so you can read the Initial Resistance and then the final resistance when the CS is done. When you first put the Distilled Water into the vessel, the Initial Resistance should be about ½ milliamp or lower, depending on how pure your DW is. Run this setup with the stirring motor stirring the DW until the voltage is between 2.6 and 2.8 milliamps or so. It should take about 4 hours. I don't have any idea what the PPM of silver this mixture has, but it has worked wonders on many different conditions. The CS should be clear.

I am not an electrician or an engineer. I post this for informational purposes only and do not remember where it was originally posted. Use this information at your own risk!

[Four nine volt batteries can be used as well in this design. We found that utilizing the stirring device to control the current was a novel idea]

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### **Colloidal Silver Generator II - Batteries Not Required**

This AC powered colloidal silver generator II makes the ionic silver solution. AC powered generators produce colloidal silver solution with more silver particles than silver ions. So, based upon the [foremost research studies](#), AC produced colloidal silver is supposed to be of higher quality. This unit produces a quart of the solution in 30-60 minutes depending on the voltage and amperage of the adapter.

This design is easily constructed at home for under \$20, as it uses a recycled AC adapter for power. This design is simpler and more efficient than the [original generator design](#), but not as refined as the new Colloidal Silver Generator III. The AC adapter (110V-32V/.5amp) can be easily found at garage sales, thrift shops or even in your own junk drawer. This is very economical as costly 9V batteries are not needed. This design makes a higher grade of the solution, faster, more consistently, and in larger quantities.

Historically speaking, silver has been used to treat a variety of conditions including: fungus, viral and bacterial infections and burns. It "reportedly" works by interfering with the respiration of pathogenic organisms. It is used both topically and internally; by drinking, applying to the skin, or swishing under the tongue (sublingually). Even small amounts of colloidal silver solution can kill 100% of bacteria and viruses quickly when added to samples of heavily polluted water.

Colloidal silver solution "reportedly" bolsters our immune system while dispatching single celled organisms. Because this solution is 100% lethal to pathogens, it does not create more resistant varieties like antibiotics. Applied to burns it accelerates healing and new cell growth. It can be sprayed from an atomizer on skin, or into the mouth and throat. It can also be used on infants, children and pets.

Supplies You will need to make this colloidal silver design:

- AC adapter (mine was from an old HP 540C printer 30V/.5amps). This one seems ideal, but any 110AC adapter within an output range of 24V-36V/ at .5 amp to 1 amp will work.
- distilled water
- 1 quart mason jar - two wires, coins or bars of 99.99% pure silver (sources below)
- wood or plastic stir stick
- wood glue
- two small alligator clips, from Radio Shack
- small button toggle safety switch, from Radio Shack (not shown)
- small wooden base (4" x 8" or so)
- multi tool or Swiss army knife (to cut and saw with)
- thin wooden strips (for top cross piece to hold the silver wires)
- plastic lid (as a base for Mason jar)
- large rubber band or elastic cord (to secure AC adapter to base)
- Funnel to transfer the silver elixir into storage bottles
- scotchbrite pad for cleaning silver wires after each use
- an optional aquarium air pump, to agitate the solution during electrolysis.



#### Making the Generator:

1. Cut wooden base to fit AC adapter, and Mason jar. Drill holes to secure adapter to base
2. Cut wooden cross bar that fits top of Mason jar (1" wider than jar mouth)
3. Drill two holes one inch apart in the center of cross bar (to hold silver wires). These should be just slightly larger than diameter of silver wires.
4. Glue two small wooden pieces to opposite ends of wooden cross bar, so bar fits snugly onto top of Mason jar. (you can turn jar upside down on top of the cross bar to glue the ends so the fit will be exact).
5. With the adapter unplugged :- ) cut the AC adapter cord's plug (cut the low voltage wire end, not the wall plug end) and leave about one and one half feet of wire intact.
6. Strip about 1/2 inches off of the cut wire ends.
7. Attach alligator clips to the wire ends and crimp with pliers to secure them.
8. Install safety switch and/or a small light bulb\* to wire between alligator clips and the AC adapter (not shown in photos, as I use a surge protector with a built in switch and light).
9. Assemble generator as shown in the photo below:
10. Fill mason jar with distilled water 1/4" to 1/2" from the top.
11. Attach the 2 alligator clips to silver wires ends sticking up from the cross bar, and slip them through the drilled holes in the jar's wooden cross bar.



12. Plug in the AC adapter to wall outlet. You are ready to begin making colloidal silver solution.
13. Throw switch while muttering "It's alive... it's alive" like Doctor Frankenstein.
14. Set a timer for 30 minutes, stirring every 30 seconds or so with a chopstick or other non-conductive swizzle stick. This increases the production of the beneficial silver ions and reduces white scale and black silver crystals (which you don't want in the final product). Tiny fizzy bubbles will start to form after a few minutes on one pole. A flashlight beam helps to see this. After process is completed, strain mixture through a non-bleached coffee filter or cotton cloth to remove any crystals or scale. Store the elixir in a dark glass bottle in a cool place. This will keep for several months, but it is best to make small quantities and use when fresh.
15. Wash mason jar after every use, then rinse with distilled water. Clean silver wires with scotchbrite pad to remove scale and silver crystals.

To increase the quality of your colloidal solution, you can use an aquarium air pump with a short hose to agitate the solution. Experts agree that this helps make the best quality solution.

The usual dosage is 1-2 tablespoons twice per day. Some people claim that their intestinal flora can be disrupted by colloidal silver. I haven't had a problem with this myself. But if this happens to you, it is best to swish it around the mouth and/or gargle the solution and not swallow. This allows absorption of beneficial silver ions through the mucus membranes (sublingual absorption). Eating yogurt several hours later will replace any friendly bacteria lost.

Many alternative health sources "claim" that colloidal silver offers some protection from air or water-borne viruses and pathogens (such as the common cold, flu, smallpox, anthrax, S.A.R.S., etc.) and recommend increasing dosage to one to two ounces, twice per day when symptoms appear. These sources state that one must take the solution for 5-7 days before full protection to take effect.

\*An online reader suggested that a small light bulb be added in line as a safety feature, to show when contact is being accidentally made.

To get pure silver:

- Canadian Maple Leaf coins - from any coin seller
- two one ounce bars of 99.99% pure silver: [click here](#)
- the best source I have found for 99.99% thick pure silver wire: [click here](#)

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**Colloidal Silver DC Generator III - LW's new and improved Design**  
by **Lightman** - revised 11.16.03

As each year goes by improvements in the process of making colloidal silver abound. The Colloidal Silver Generator III reflects these improvements over the Colloidal Silver Generator II.

The improvements Include:

- A 9v DC adapter / 300mA - 500mA (used to charge batteries) instead of the 36volt/.5 Amp AC adapter. The DC unit produces a greater quantity of silver ions and fewer

silver particles than the AC powered unit. Researchers disagree as to which is better: smaller but more abundant more silver particles, or more silver ions. Both occur during electrolysis, but vary as to AC or DC current.

- A small aquarium pump to agitate the solution as it is being electrolyzed. This is easier than stirring continuously, and radically improves the ppm.

### Making the Colloidal Silver Generator III

Supplies You will need to make this new colloidal silver design:

- a DV adapter (9V/ 300mA-500mA). Available at Radio Shack for about \$5. I got several for .25 cents each at a thrift shop.
- distilled water
- 1/2 quart mason jar
- two 99.99% pure silver wires , coins, or bars
- aquarium air pump (often found at thrift shops)
- two insulated alligator clips, from Radio Shack
- small wooden base (4" x 8" or so)
- saw or Swiss army knife for cutting wood strips
- wood glue for jar top
- electric drill and bit
- plastic lid (as a base for Mason jar)
- large rubber band or elastic cord (to secure DC adapter to base)
- wood scraps to make jar cap/wire holder



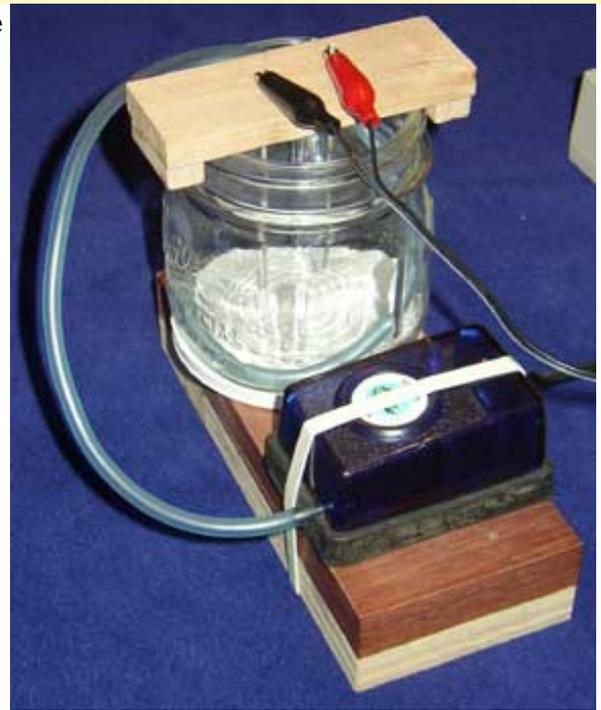
### Additional supplies

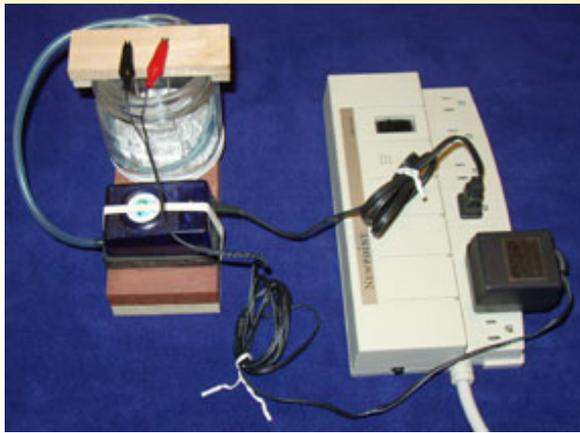
- Surge protector strip with on/off switch. So you can turn on DC .adapter and air pump at the same time.
- Funnel to transfer the silver elixir into storage bottles
- scotchbrite pad for cleaning silver wires after each use

### Making the Generator

1. Cut wooden base to fit DC adapter, and Mason jar.
2. Cut wooden cross bar that fits top of Mason jar (1" wider than jar mouth)
3. Drill two holes one inch apart in the center of cross bar (to hold silver wires). These should be just slightly larger than diameter of silver wires.

4. Glue two small wooden pieces to opposite ends of wooden cross bar, so bar fits snugly onto top of Mason jar. (you can turn jar upside down on top of the cross bar to glue the ends so the fit will be exact). Note: To use silver bars or coins instead of silver wire electrodes, this design must be modified. I suggest permanently attaching the alligator clips to the side of the wooden crossbar, with the clips pointed down (1/2" below bottom of the crossbar). In this way you can attach any silver coin or bar to the alligator clips.
5. With the adapter unplugged :- ) cut the DC adapter plug (cut the low voltage wire end, not the wall plug end) and leave most of the wire attached.
6. Strip about 1/2 inch off of each of the cut wire ends.
7. Attach alligator clips to the wire ends and crimp with pliers, or solder to secure them.
8. Install safety switch and/or a small light bulb\* to wire between alligator clips and the AC adapter (not shown in photos, as I use a surge protector with a built in switch and light).
9. Assemble generator as shown in the photo below. Make sure that the air pump is rubber banded to the base, or it will vibrate off. :
10. Fill mason jar with distilled water 1/4" to 1/2" from the top.
11. Attach the 2 alligator clips to silver wires ends sticking up from the cross bar, and slip them through the drilled holes in the jar's wooden cross bar.
12. Plug in the AC adapter to wall outlet. You are ready to begin making colloidal silver solution.
13. Throw switch on the surge protector while muttering "It's alive... it's alive" like Doctor Frankenstein.
14. Set a timer for three to four hours minutes.
15. Make sure that both the pump and the DC adapter are working. You can hear the pump, but might have to test the DC output with a voltage tester.
16. The bubbler enhances the quality of the silver solution and reduces white scale and black silver crystals (which you don't want in the final product). Tiny fizzy bubbles will start to form after a few minutes on one pole. A flashlight beam helps to see this.
17. After process is completed, strain mixture through a non-bleached coffee filter or cotton cloth to remove any crystals or scale. Store the elixir in a dark glass bottle in a cool place. This is reported to keep for several months, but it is best to make small quantities as needed. Fresh is best.
18. Wash mason jar, and air pump tube after every use, then rinse with distilled water. Clean silver wires with scotchbrite pad to remove scale and silver crystals, then rinse. Dry then store all components of the generator together in a dust-proof tupper or container.





The Generator III hooked up to surge protector.

## Dosage

The usual dosage is 1-2 tablespoons twice per day. Some people with touchy stomachs claim that their intestinal flora can be disrupted by colloidal silver. I haven't had a problem with this myself. But if this happens to you, it is best to swish it around the mouth and/or gargle the solution and not swallow. This allows absorption of beneficial silver ions through the mucus membranes (sublingual absorption). Eating yogurt several hours later will replace any friendly bacteria lost.

Alternative health sources "claim" that colloidal silver offers some protection from air or water-born viruses and pathogens (such as the common cold, flu, smallpox, anthrax, S.A.R.S., etc.) and recommend increasing dosage to one to two ounces, twice per day when danger or symptoms appear. These sources state that one must take the solution for 5-7 days before full protection to take effect.

\*An online reader suggested that a small light bulb be added in line as a safety feature, to show when contact is being accidentally made.

To get pure silver:

- Canadian Maple Leaf coins - from any coin seller
- two one ounce bars of 99.99% pure silver: [click here](#)
- the best source I have found for 99.99% thick pure silver wire: [click here](#)
- Another good source for .9999 silver wire is [here](#)

## Additional Suggestions From Readers:

Firstly, I prefer a 1 quart glass mayonnaise jar with a plastic top, I'd be a little concerned about the metal top of the mason jar leaching into the silver water, just my opinion.

My preference for the alligator clips are the plated or stainless steel type to prevent copper from leaching into the water if splashed.

Mentioned in the article but not shown in the picture: you should add a fish tank 'bubbler' with tubing, to the system to keep mixing the solution while the added oxygen from the bubbler helps to keep the particles small. Some brewers actually add oxygen drops to the solution to break up the silver particles, so the added oxygen brought in by the bubbler is an added bonus, not to mention the mixing action that it provides. Larger particles can not be absorbed into the blood from the lining of the stomach so it is important to keep the

silver particles as small as possible. Only the smallest particles are effective against viruses and many bacteria as well.

As far as the electrodes go, I prefer using 2 Canadian Maple leaf silver \$5 pieces placed about 1.25" apart. They are graded at .9999% silver and will last for ever. I buy them un-circulated and sealed in plastic by the mint, from a coin dealer in my area for about \$7 or \$8 ea. They have much more surface area than the silver wires so more is available to conduct electricity and drop silver particles into the solution. You can either drill holes through the top of the plastic jar-cover and clip into place from the outside (so clips don't come into contact with water). Or as I recently did - drill small holes through the tops of the coins and run .9999 silver wires through and stick through the jar cover to clip leads to. The coins will hang from the wires into the water. Using silver wire to hang off of allows the coins to be almost completely submerged (more surface area). Be sure coins are secured so they do not touch together and short your circuit causing the power supply to blow out.

When colloidal silver starts brewing in the distilled water, the water has very little conductivity and the particles break off in very small sizes (most useful to the body). As silver starts getting into the water, the water becomes much more conductive and the particles start getting larger and larger as the water becomes more conductive, until you can actually see the particles and they can become huge which are totally useless to the body, they call this silver mud (something you don't want).

You need a way to monitor this and control the current. Using the plan shown on the link, it is good to add an amp meter or digital multi-meter that can be purchased at Wal-Mart for about \$17. Just connect it in series with the positive lead of your CS generator. This can also act as a circuit breaker in case you accidentally hit the 2 leads together. When you start the brewing process your distilled water will probably read about 100u-amps (1/10 of a milliamp). You will see the numbers on the amp meter rise as micro particles of silver drops into the solution and the water becomes more conductive to electricity.

As the conductivity rises and the numbers go up on the meter, your particles will also get larger. You need to add a current limiting device to the circuit. A potentiometer or variable resistor works okay, but has to be monitored and manually adjusted to keep the current down.

You can automatically control the current by adding a 'current limiting diode'. Insert the diode in series with the positive lead of the CS generator (anode), be sure that the little stripe on the diode is pointing toward the power supply side of the circuit and not toward the electrode or alligator clip leading to the electrode.

Using the current limiting diode will allow the current to maintain at a set amount. Many people that brew their own CS, limit their current to stay under 1 ma. I've done a lot of experimenting and actually prefer keeping the current much lower, around max .28 milliamps, using a 30VDC power supply. This keeps the solution crystal clear, which tells me that the end product has extremely small particles. There is a slight metallic taste. You know the CS is there because when the solution is done, if you temporarily bypass the diode you will see the water conductivity is now about 1.2 milliamps, 10Xs greater than at the start. Results confirmed with a PWT meter (more about this later).

You can purchase various 'current limiting diodes' to keep it at 1 milliamps, .5 milliamps, or less, and experiment for yourself. When I run at a 1 milliamp limit, I find some larger particles that I end up having to filter out with an unbleached coffee filter. If not filtered these particles will probably just drop out of solution after being refrigerated for a couple of

days, as they are actually not colloidal. The lower current prevents the need to filter and lessens the chance of adding contaminants or paper dust to the solution.

I had trouble finding these diodes at Radio Shack. I got the best price from Mouser.com and the service was great. I plan to build my Auto-Godzilla getting most of the parts from Mouser as well. Here is a catalog link for the current limiting diodes from mouser. Tip: odd numbers same money - a 1ma limit diode is \$4.29 whereas a .91ma diode is only \$1.78.

<http://www.mouser.com/catalog/622/287.pdf>

A home built CS generator works best with everything plugged into a power strip with its own built-in circuit breaker, plugged into a grounded electric timer. Most exterior type timers are grounded. The timer allows you to set it and forget it once you experiment and find out how long your brewing times should be to get the desired results.

To estimate your silver content in solution, you can find a TDS (total dissolved solvents) meter on eBay for about \$10-\$15, these test silver ions, not particles. Also Hanna has a good meter called a PWT meter (pure water tester), that can be purchased online for as low as \$55. The PWT tests conductivity of water and may be better to test actual particle content rather than the TDS meter.

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**Colloidal Silver Solar Generator - LW's new sun-powered design**  
by **Lightman** - designed on 11.27.03 - Happy Thanksgiving!

Well here is another CS generator using six small recycled solar cells (I just can't stop myself :o)

The cells were salvaged from a set of old solar path lights that I got free at a garage sale. Each cell puts out about 4.2 Volts DC. So I soldered the wires together (+ to -) in series, and the little guys puts out a respectable 28-32 Volts at .4mA. 30v is the recommended voltage for making colloidal silver, as it generates minimal scale and silver crystals, and keeps the silver wires clean during the process.

The Colloidal Silver Generator IV requires several hours of direct sunlight (3-4) to produce a good batch of CS. Make sure that your cables are long enough to locate the mason jar in a dark place (inside, or in a box) while the solution is being made. Sunlight degrades colloidal silver solution. An opaque glass jar would work too.

Use a high grade of distilled water: no ionized or mineralized drinking water. Stir frequently, or use an aquarium bubbler to agitate the solution. Follow the same procedures and precautions as are detailed in the other three generator designs.

### **Making the Colloidal Silver Generator IV - Sun Powered**

Supplies You will need to make this new colloidal silver design:

- a small commercial solar panel, or salvaged solar cells.
- extra insulated wire and alligator clips for hooking up solar cells/panel
- a soldering iron and some solder (silver solder is best)

- a plywood base for silicone gluing the cells into place
- some scotch tape (to temporarily hold cells in place while assembling)
- high quality distilled water
- 1/2 quart mason jar
- two 99.99% pure silver wires or silver coins
- wooden chopstick, or an aquarium air pump (often found at thrift shops) for agitating the solution
- two insulated alligator clips, from Radio Shack
- saw or Swiss army knife for cutting wood for cap and base
- wood glue for jar top
- clear silicone adhesive
- electric drill and bit
- plastic lid (as a base for Mason jar)
- wood scraps to make jar cap/wire holder



#### Additional supplies

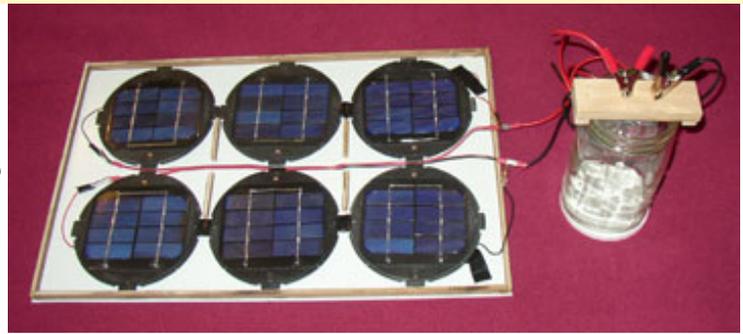
- Funnel to transfer the silver elixir into storage bottles
- scotchbrite pad for cleaning silver wires after each use

#### **Making the Generator from individual cells**

(#1 to 11 are optional if you are using a store-bought panel)

1. Cut wooden base to fit solar cells (add an extra inch or so if you are going to frame the base to protect the cells).
2. Cut wooden cross bar that fits top of Mason jar (1" wider than jar mouth), and two small end pieces.
3. Drill two holes one inch apart in the center of cross bar (to hold silver wires). These should be just slightly larger than diameter of silver wires used.
4. Glue the two small wooden pieces to opposite ends of wooden cross bar, so bar fits snugly onto the top of Mason jar. (you can turn jar upside down on top of the cross bar to glue the ends so the fit will be exact). A slight twist tightens the cap on the jar if you glue them on the narrowest thread area.
5. Cut some thin wooden strips to make frame to protect cell array.
6. Tape the cells face down on the plywood base temporarily for positioning
7. Wire all of the cells together and solder the twisted ends together.
8. Turn the assembly over gently (another piece of plywood helps - make a plywood and solar cell sandwich. Then gently pry the cells away from the board they are taped to. They will be right-side-up now.

9. Test the solar panel to make sure all of your soldered connections are good.
10. Glue the protective frame onto the wooden base. You can also glue an optional piece of Plexiglas on top of the frames to completely seal in, and protect the panel.
11. Use the tube of silicone to glue the cell array to the base. Take care to keep everything together.
12. Strip about 1/2 inch off of each of the long cable cut wire ends.
13. Attach alligator clips to the wire ends and crimp with pliers, or solder to secure them.
14. Install safety switch and/or a small light bulb\* to wire between alligator clips and the AC adapter (not shown in photos, as I use a surge protector with a built in switch and light).
15. Assemble generator as shown in the photo below. - You are done!



### **Making the colloidal silver solution**

1. Fill mason jar with distilled water 1/2" from the top.
2. Attach the 2 alligator clips to silver wires ends sticking up from the cross bar, and slip them through the drilled holes in the jar's wooden cross bar.
3. Place the solar generator into the sunlight. You are ready to begin making colloidal silver solution.
4. Set a timer for three to four hours. Turn on the bubbler or start stirring with the chopstick.
5. To make sure that panel is working, you could test the DC output with a voltage tester.
6. You can test the concentration of the solution with a laser pointer, the silver particles will reflect the coherent light in a cone shape after the first hour, this will increase until target concentration is reached.
7. The solution should be clear, or a very light yellow color when done.
8. After process is completed store the elixir in a dark glass bottle in a cool place. This should keep for a couple of months, It is best to make small quantities as needed. Fresh is best.
9. Wash mason jar, and air pump tube after every use, then rinse with distilled water. Clean silver wires with scotchbrite pad to remove scale and silver crystals, then rinse. Dry then store all components of the generator together in a dust-proof tupper or container.

### **Warnings - AMA Disclaimer**

This device is meant to produce colloidal silver solution, which is a "mineral supplement". We make no claims about it as an antibiotic or as a curative agent.

- Some individuals report disruption of friendly flora and fauna after ingesting colloidal silver. For those who are gastrically sensitive to colloidal silver; handbooks recommend gargling colloidal the solution without swallowing, to protect friendly intestinal bacteria (many silver ions are absorbed through mucus membranes of the mouth during gargling). The eating of organic yogurt is sometimes recommended to

replace friendly intestinal bacteria.

- High dosages of colloidal silver over an extended period of time are not recommended, as these can cause the buildup of silver residue in the joints, gums and eye whites. But when we consider the dreadful toxicity and side effects of pharmaceutical antibiotics, colloidal silver's side effects are minor by comparison.

Live long and prosper!

**Lightman**

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by Lightman - revised 11.16.03.03 - photos by Lightwatcher Publishing

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# Silver Bullion

## Silver Investment Products

- One Ounce Silver Round Coins
- Silver Bars
- American Silver Eagle Coins
- Canadian Silver Maple Leaf Coins
- 90% U.S. Silver Bags



Prices are subject to frequent market changes as shown in the chart above. Please call for current prices. **1-800-344-6468** (Monday through Friday, 7:00am to 5:00pm Pacific Time).

[Learn about the history of silver](#)

Northwest Territorial Mint has become known as **"The Source"** for silver bullion. We are a silver bullion mint and offer the most competitive prices in the marketplace. Because we mint silver bullion, we are a direct source for silver products, we stand behind our products and confidently sell to you, the investor, with pride and the knowledge that you will be satisfied with our product.

**All Bullion prices include Shipping within the continental U.S., and Insurance!**

[Additional shipping fees for deliveries to Hawaii, Alaska, and Canada](#)

## One Ounce Silver Round Coins from NWTMint

1 Troy ounce of .999 Silver minted by Northwest Territorial Mint to exacting standards. One ounce ingots, especially in round form, have the advantage of being tradable in small units. This is essential if you want to sell or trade a portion of your investment. Silver rounds come in durable plastic storage containers to keep silver coins from any damage.



Silver Content	Diameter	Thickness
1 Troy oz.	39 mm	2.87 mm

## One Ounce Silver Rounds:

**Minimum quantity of 60**

Total Quantity in Ounces	
<b>60-99 oz</b>	<b>Spot (Market Price) + .70 per oz</b>
<b>100-499 oz</b>	<b>Spot (Market Price) + .65 per oz</b>
<b>500-999 oz</b>	<b>Spot (Market Price) + .55 per oz</b>
<b>1000-4999 oz</b>	<b>Spot (Market Price) + .50 per oz</b>
<b>5000 oz or more</b>	<b>Spot (Market Price) + .45 per oz</b>

### Silver Bars

1, 5, and 10 Troy ounce Silver bars are minted by Northwest Territorial Mint to exacting standards. All are minted of .999 fine silver. If unconcerned about barter and when looking at investment potential only, these bars are an excellent medium to hold silver. 100 troy ounce bars are not produced here. We buy and sell bars from Engelhard, Johnson-Matthey, and others. If you have special need for a 1000 troy ounce bar give us a call.

Silver bars minted at Northwest Territorial Mint are placed in plastic sleeves for added protection. Most other dealers do not offer this feature..



Silver Content	Length	Width
1 Troy oz.	50 mm	29 mm
5 Troy oz.	61 mm	35 mm
10 Troy oz.	90 mm	46 mm
100 Troy oz.		

**Silver Bars: 1, 5 and 10 ounce bars:****Minimum quantity of 50 ounces****Total Quantity in Ounces**

<b>50-99 oz</b>	<b>Spot (Market Price) + .70 per oz</b>
<b>100-499 oz</b>	<b>Spot (Market Price) + .65 per oz</b>
<b>500-999 oz</b>	<b>Spot (Market Price) + .55 per oz</b>
<b>1000-4999 oz</b>	<b>Spot (Market Price) + .50 per oz</b>
<b>5000 oz or more</b>	<b>Spot (Market Price) + .45 per oz</b>

**Silver Bars: 100 ounce bars:****Number of Bars**

<b>1-9 bars</b>	<b>Spot (Market Price) + .40 per oz</b>
<b>10 bars or more</b>	<b>Spot (Market Price) + .35 per oz</b>

**Prices are subject to frequent market changes. Please call for up to date price quotes.**

**1-800-344-6468 (Monday through Friday, 7:00am to 5:00pm Pacific Time).**

**American Silver Eagle Coins**

Silver Eagles have become the most popular bullion coin in the world because of its beauty, quality and the assurance of content by the U.S. Government. The design is based on the famous "Walking Liberty" of Adolph Weinman's 1916 U.S. half-dollar, considered to be one of the most beautiful coins ever minted. Every Silver Eagle is a meticulously crafted work of art, produced to the exacting standards of The United States Mint. This is an excellent affordable way to own silver coins. The only silver bullion coins whose weight and purity are guaranteed by the United States government. 1 troy ounce, 99.9% pure and is also legal tender.

**U.S. Government Guarantee**

What really makes the American Eagle unique is that it is the only bullion coin whose weight, content, and purity is backed by the United States Government. You can buy them with confidence knowing each coin contains its stated amount of silver. And since they require no assaying, they can be easily converted to cash at any time without worries or penalties.

It is simple to keep track of the value of your American Eagles. Most major newspapers and television and radio networks report the current spot price of silver. Each American Eagle's value is based on this price, plus a small premium to cover mintage and distribution costs.



<b>Silver Content</b>	<b>Diameter</b>	<b>Thickness</b>
1 Troy oz	40.6 mm	2.98 mm

**American Eagle Coins:****Minimum quantity of 60****Number of Coins****60-499****Spot (Market Price) + 2.00 per coin****500 or more****Spot (Market Price) + 1.75 per coin****Canadian Silver Maple Leaf Coins**

The Canadian Silver Maple Leaf is the purist silver coin in the world today. Its purity of .9999 is guaranteed by The Royal Canadian Mint, whose reputation is world wide. The national symbol of Canada, a single maple leaf adorns the reverse of this beautiful coin while the obverse bears a sculpture of Queen Elizabeth II. This coin is often the designated choice of discriminating collectors and investors not only because of its beauty, but because of the extraordinary purity and quality necessary to meet the standards of The Royal Canadian Mint. A wonderful coin to add to your portfolio.



Silver Content	Diameter	Thickness
1.0000 Troy oz	38.0 mm	3.29 mm

**Canadian Maple Leaf Coins:****Minimum quantity of 200**

Please order in increments of 10

(i.e.: 210, 220, 230...)

**Spot (Market Price) + 2.00 per coin****90% U.S. Silver Bags**

The most popular way to invest in silver bullion is the 90% U.S. silver bags. They weigh 54 pounds and are sometimes called "junk" silver bags which is misleading. This unfortunate name was developed in the 1970s and used to describe a bag of average circulated silver coins, meaning the investor was not to think there were any rare coins included.

The industry estimates each bag which contains a face value of \$1000.00 has 715 troy ounces of actual silver. All silver coins struck in 1964, dimes, quarters, or half dollars, or earlier are 90% pure so bags will move up or down with the daily price of silver.

There are several advantages when acquiring bags of silver. First they provide small increments of barter. Secondly, the bag carries a low premium over spot silver. Thirdly, they are legal U.S. tender. Finally, silver bags are recognized around the world as a trading medium and are therefore very liquid.



715 Total Troy Ounces

**90% Silver Bag:**

**\$5,130.00**

Pricing fluctuates with the market price of Silver. Please call

**All bullion prices include Shipping within the continental U.S., and Insurance!**

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# Silver

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## Silver

We offer world renowned silver bullion coins, such as the American Eagle and Canadian Maple Leaf, private label silver rounds and bars in a variety of sizes, including our own propriety products, and a full range of additional silver investment options, from 90% silver bags to numismatic treasures like the Morgan and Peace silver dollars.

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**90% Silver Bags**



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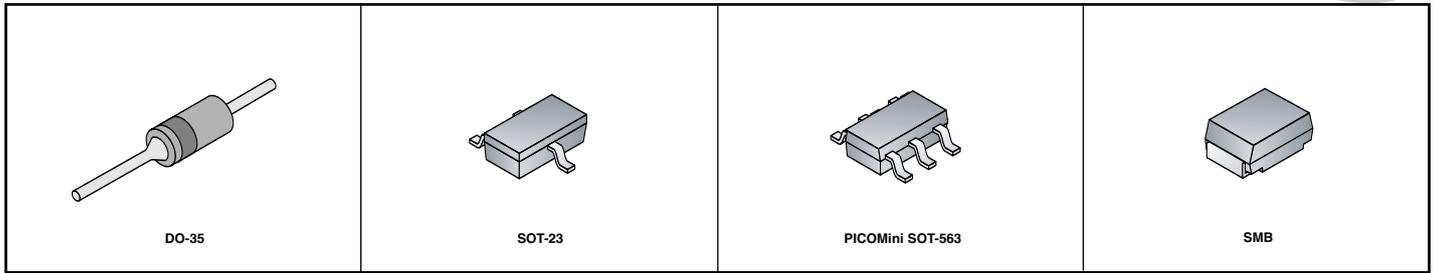
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# CENTRAL Diodes



◆ Surface Mount Device

## DIODES

For quantities of 2000 and up, call for quote.

MOUSER STOCK NO.	Central Part No.	Package	Description	Price Each			
				1	100	500	1000
<b>Switching Diodes</b>							
610-1N3600	1N3600	DO-35	Signal Diode	.12	.05	.05	.05
610-1N4152	1N4152	DO-35	Sili Sig Diode	.14	.12	.11	.10
610-1N914	1N914	DO-35	Sili Sig Diode	.06	.05	.04	.03
◆610-CMOD2004	CMOD2004	SOD-523	High Voltage	.25	.20	.17	.13
◆610-CMPD2004	CMPD2004	SOT-23	High Voltage Diode	.55	.45	.43	.39
◆610-CMPD4448	CMPD4448	SOT-23	SW Diode	.25	.19	.14	.09
◆610-CMPD914	CMPD914	SOT-23	Single Switch	.18	.14	.12	.09
◆610-CMKD7000	CMKD7000	SOT-363	100V, 200mA	.33	.27	.22	.17
◆610-CMSD7000	CMSD7000	SOT-323	100V, 200mA	.27	.20	.17	.14
◆610-CMPD6001A	CMPD6001A	SOT-23	100V, 250mA	.38	.28	.24	.19
◆610-CMPD6001C	CMPD6001C	SOT-23	100V, 250mA	.38	.28	.24	.19
◆610-CMLD6001	CMLD6001	SOT-563	100V, 250mA	.42	.35	.29	.26
◆610-CMLD6001DO	CMLD6001DO	SOT-563	100V, 250mA	.48	.40	.33	.30
◆610-CMPD6001S	CMPD6001S	SOT-23	100V, 250mA	.38	.28	.24	.19
◆610-CMOD4448	CMOD4448	SOD-523	100V, 250mA	.17	.14	.11	.09
◆610-CMOD6001	CMOD6001	SOD-523	100V, 250mA	.22	.18	.14	.12
◆610-CMPD6001	CMPD6001	SOT-23	100V, 250mA	.38	.28	.24	.19
◆610-CMXD4448	CMXD4448	SOT-26	100V, 250mA	.33	.24	.20	.17
◆610-CMKD6001	CMKD6001	SOT-363	100V, 250mA	.33	.27	.22	.17
◆610-CMXD6001	CMXD6001	SOT-26	100V, 250mA	.40	.29	.25	.20
◆610-CLL914	CLL914-TR	SOD-80	100V 1A	.20	.15	.12	.08
◆610-CMPD2836E	CMPD2836E	SOT-23	120V, 200mA	.13	.11	.09	.07
◆610-CMPD2838E	CMPD2838E	SOT-23	120V, 200mA	.13	.11	.09	.07
◆610-CMPD7000E	CMPD7000E	SOT-23	120V, 200mA	.13	.11	.09	.07
◆610-CMLD4448DO	CMLD4448DO	SOT-563	120V, 250mA	.39	.32	.25	.21
◆610-CMLD4448	CMLD4448	SOT-563	120V, 250mA	.39	.32	.25	.21
◆610-CMPD914E	CMPD914E	SOT-23	120V, 250mA	.10	.08	.07	.06
◆610-CMHD3595	CMHD3595	SOD-123	150V, 225mA	.44	.32	.27	.22
◆610-CMPD3003A	CMPD3003A	SOT-23	180V, 200mA	.30	.25	.21	.19
◆610-CMPD3003C	CMPD3003C	SOT-23	180V, 200mA	.30	.25	.21	.19
◆610-CMPD3003S	CMPD3003S	SOT-23	180V, 200mA	.30	.25	.21	.19
◆610-CMPD3003	CMPD3003	SOT-23	180V, 200mA	.35	.25	.21	.18
◆610-CMSD2004S	CMSD2004S	SOT-323	300V, 200mA	.53	.38	.32	.27
◆610-CMXD2004	CMXD2004	SOT-26	300V, 200mA	.44	.32	.27	.22
◆610-CMXD2004TO	CMXD2004TO	SOT-26	300V, 200mA	.48	.40	.33	.30
◆610-CMLD2004A	CMLD2004A	SOT-563	300V, 225mA	.52	.43	.35	.28
◆610-CMLD2004C	CMLD2004C	SOT-563	300V, 225mA	.52	.43	.35	.28
◆610-CMLD2004DO	CMLD2004DO	SOT-563	300V, 225mA	.52	.43	.35	.28
◆610-CMLD2004S	CMLD2004S	SOT-563	300V, 225mA	.52	.43	.35	.28
◆610-CMPD2004S	CMPD2004S	SOT-23	300V, 225mA	.63	.63	.25	.23
◆610-CMOD2004	CMOD2004	SOT-563	300V, 225mA	.25	.20	.17	.13
◆610-CMLD2004	CMLD2004	SOT-563	300V, 225mA	.46	.38	.31	.24
◆610-CMPD2005S	CMPD2005S	SOT-23	350V, 225mA	.41	.34	.27	.22
◆610-CMKD2836	CMKD2836	SOT-363	75V, 200mA	.33	.27	.22	.17
◆610-CMSD2836	CMSD2836	SOT-323	75V, 200mA	.27	.20	.17	.14
◆610-CMKD2838	CMKD2838	SOT-363	75V, 200mA	.33	.27	.22	.17
◆610-CMSD2838	CMSD2838	SOT-323	75V, 200mA	.27	.20	.17	.14
◆610-CMEDA-6I	CMEDA-6I	SOT-28	Array 60V, 250mA	1.14	.93	.76	.60
<b>Current Limiting Diode</b>							
610-1N5283	1N5283	DO-35	.22mA Curr Reg	4.61	4.32	4.09	4.03
610-1N5284	1N5284	DO-35	.24mA Curr Reg	4.29	3.86	3.48	3.13
610-1N5285	1N5285	DO-35	.27mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5286	1N5286	DO-35	.30mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5287	1N5287	DO-35	.33mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5288	1N5288	DO-35	.39mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5289	1N5289	DO-35	.43mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5290	1N5290	DO-35	.47mA Curr Reg	4.29	3.86	3.48	3.13
610-1N5291	1N5291	DO-35	.56mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5292	1N5292	DO-35	.62mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5293	1N5293	DO-35	.68mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5294	1N5294	DO-35	.75mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5295	1N5295	DO-35	.82mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5296	1N5296	DO-35	.91mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5297	1N5297	DO-35	1.0mA Curr Reg	4.29	3.86	3.48	3.13
610-1N5298	1N5298	DO-35	1.1mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5299	1N5299	DO-35	1.2mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5301	1N5301	DO-35	1.4mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5302	1N5302	DO-35	1.5mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5303	1N5303	DO-35	1.6mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5304	1N5304	DO-35	1.8mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5305	1N5305	DO-35	2.0mA Curr Reg	4.29	3.86	3.48	3.13
610-1N5306	1N5306	DO-35	2.2mA Curr Reg	1.78	1.63	1.49	1.21

## DIODES (CONT.)

For quantities of 2000 and up, call for quote.

MOUSER STOCK NO.	Central Part No.	Package	Description	Price Each			
				1	100	500	1000
<b>Current Limiting Diode (Cont.)</b>							
610-1N5307	1N5307	DO-35	2.4mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5308	1N5308	DO-35	2.7mA Curr Reg	1.78	1.63	1.49	1.21
610-1N5309	1N5309	DO-35	3.0mA Curr Reg	4.29	3.86	3.48	3.13
610-1N5310	1N5310	DO-35	3.3mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5311	1N5311	DO-35	3.6mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5312	1N5312	DO-35	3.9mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5313	1N5313	DO-35	4.3mA Curr Reg	2.35	2.16	1.97	1.60
610-1N5314	1N5314	DO-35	4.7mA Curr Reg	4.29	3.86	3.48	3.13
<b>Schottky Diode</b>							
◆610-CMSH120	CMSH1-20	SMB	1A 20V	.67	.47	.33	.29
610-CDSH270	CDSH270A	DO-35	100V 100mA Rec	.35	.28	.25	.23
◆610-CMOSH-3	CMOSH3	SOD-523	30V 100mA	.30	.24	.20	.16
◆610-CMPSH-3C	CMPSH-3C	SOT-23	Dual Cl Cathode	.42	.36	.32	.29
◆610-CMLD6263A	CMLD6263A	SOT-563	Pair Common Anode	.99	.89	.79	.69
◆610-CMLD6263C	CMLD6263C	SOT-563	Pair Common Cathode	.99	.89	.79	.69
◆610-CMLD6263S	CMLD6263S	SOT-563	Dual Pair In Series	.99	.89	.79	.69
◆610-CMLD6263DO	CMLD6263DO	SOT-563	Dual Opposing	.99	.89	.79	.69
◆610-CMLD6263	CMLD6263	SOT-563	Single	.89	.80	.71	.62
◆610-CMHS5-2L	CMHS5-2L	SOD-123	20V, 500mA	.24	.20	.16	.13
◆610-CMPSH-3AE	CMPSH-3AE	SOT-23	30V, 100mA	.52	.44	.36	.28
◆610-CMSSH-3A	CMSSH-3A	SOT-323	30V, 100mA	.40	.29	.25	.20
◆610-CMPSH-3CE	CMPSH-3CE	SOT-23	30V, 100mA	.26	.22	.18	.14
◆610-CMSSH-3C	CMSSH-3C	SOT-323	30V, 100mA	.40	.29	.25	.20
◆610-CMKSH-3DO	CMKSH-3DO	SOT-363	30V, 100mA	.33	.27	.22	.17
◆610-CMPSH-3SE	CMPSH-3SE	SOT-23	30V, 100mA	.26	.22	.18	.14
◆610-CMSSH-3S	CMSSH-3S	SOT-323	30V, 100mA	.40	.29	.25	.20
◆610-CMOSH-3	CMOSH-3	SOD-523	30V, 100mA	.30	.24	.20	.16
◆610-CMPSH-3E	CMPSH-3E	SOT-23	30V, 100mA	.20	.16	.13	.11
◆610-CMSSH-3	CMSSH-3	SOT-323	30V, 100mA	.36	.26	.22	.18
◆610-CMKSH-3T	CMKSH-3T	SOT-363	30V, 100mA	.33	.27	.22	.17
◆610-CMXSH-3	CMXSH-3	SOT-26	30V, 100mA	.40	.29	.25	.20
◆610-CMOSH-4E	CMOSH-4E	SOD-523	40V, 200mA	.20	.16	.13	.11
◆610-CMHS5-4	CMHS5-4	SOD-123	40V, 500mA	.24	.20	.16	.13
◆610-CZSH5-40	CZSH5-40	SOT-223	40V, 500mA	.65	.53	.43	.34
◆610-CMPD6263A	CMPD6263A	SOT-23	70V, 15mA	.33	.27	.22	.17
◆610-CMSD6263A	CMSD6263A	SOT-323	70V, 15mA	.39	.32	.26	.21
◆610-CMPD6263C	CMPD6263C	SOT-23	70V, 15mA	.33	.27	.22	.17
◆610-CMSD6263C	CMSD6263C	SOT-323	70V, 15mA	.39	.32	.26	.21
◆610-CMKD6263DO	CMKD6263DO	SOT-363	70V, 15mA	.33	.27	.22	.17
◆610-CMPD6263S	CMPD6263S	SOT-23	70V, 15mA	.33	.27	.22	.17
◆610-CMSD6263S	CMSD6263S	SOT-323	70V, 15mA	.39	.32	.26	.21
◆610-CMOD6263	CMOD6263	SOD-523	70V, 15mA	.26	.22	.18	.14
◆610-CMPD6263	CMPD6263	SOT-23	70V, 15mA	.66	.59	.55	.53
◆610-CMSD6263	CMSD6263	SOT-323	70V, 15mA	.33	.27	.22	.17
◆610-CMKD6263	CMKD6263	SOT-363	70V, 15mA	.36	.30	.24	.19
<b>Zener Diode</b>							
610-1N746A	1N746A	DO-35	3.3V .5W	.18	.14	.10	.08
610-1N747A	1N747A	DO-35	3.6V .5W	.18	.14	.10	.08
610-1N748A	1N748A	DO-35	3.9V .5W	.18	.14	.10	.08
610-1N749A	1N749A	DO-35	4.3V .5W	.18	.14	.10	.08
610-1N750A	1N750A	DO-35	4.7V .5W	.18	.14	.10	.08
610							



## Publications

This section contains technical information in the form of papers, tables and graphs, lab reports, and a free book in downloadable format. The book and many reports on this site are in pdf format which requires the Adobe Acrobat Reader to view. If you do not have the Acrobat Reader plug-in installed in your browser, you can download it free from the Adobe web site. Click on the Acrobat Icon below to obtain the Acrobat Reader free.

[Frequently Asked Questions \(FAQ\)](#) - A compilation of common questions and answers. This is a *work in progress*.

[About Colloid Particle Size](#) - Describes the exaggerated claims made for colloid particle sizes and what products are advertised using such claims.

[About Ionic Silver](#) - Describes the differences between silver ions and silver particles and why it is important to know what type of silver is in a colloidal silver product.

[About Silver Protein](#) - Describes why silver protein products are sold in extremely high silver concentrations. It is the high concentration of large silver particles found in silver protein products that cause argyria, a blue-gray discoloration of the skin. Other dangers of using silver protein products are described.

[About TEM Images of Ionic Silver Solutions](#) - Describes the problems associated with attempting to use a Transmission Electron Microscope (TEM) to examine the particles in ionic silver solutions. Why the images produced by a TEM are deceptive and misleading is explained. These images are often used to market ionic silver products.

[About True Colloidal Silver](#) - What is **true colloidal silver**, what does this term really mean? This term was coined by the scientists at the Colloidal Science Laboratory (CSL) during the mid 1990's to describe a silver colloid whose nanoparticle content contained the majority of the silver present, meaning more than 50% of the silver concentration was in the form of nanoparticles.

[Antibiotic Resistance a Growing Problem](#) - Increasingly, antibiotics are becoming less effective as germ fighters as the pathogens develop an immunity to their killing power. Because antibiotics are prescribed more often for more mundane conditions, the need for germ fighters that do not cause the germs to become immune is becoming increasingly important.

[Bacteriology Study Results](#) - Challenge tests were performed on bacterial and fungal pathogens including *Aspergillus niger*, *Candida Albicans*, *Escherichia coli*, *Escherichia coli* 0157H7 (hemorrhagic e.coli), Methicillin resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Trichophyton rubrum*, Vancomycin resistant *Enterococcus faecalis* (VRE), and Vancomycin resistant *Staphylococcus aureus* (VRSA). These tests were performed by EMSL Analytical, Inc. Microbiology Division.

[Bacteriology Studies of Ionic Silver are Bogus](#) - Many ionic silver products are promoted using in vitro tests that claim to prove their effectiveness against bacteria and other pathogens. The

design of most of these test protocols are severely flawed resulting in conclusions that are at best misleading and at worst completely false.

[Bioavailability of Colloidal Silver](#) - Much has been written concerning the *bioavailability* of colloidal silver products, most of which misrepresents the true meaning of the term.

[Bogus Scientific Claims Made for Ionic Silver Products](#) - Bogus scientific claims used in ads for ionic silver products.

[Bogus Scientific Claims Made for Silver Protein Products](#) - Bogus scientific claims used in ads for silver protein products.

[Bogus Science from Natural Immunogenics](#) - "**Particulate vs. Ionic Silver**" A company that produces ionic silver products has published a study titled "Comparative Bacteriology Analysis: Particulate vs. Ionic Silver" wherein they claim to prove that ionic silver kills pathogens but silver particles don't. Because overwhelming scientific evidence clearly indicates that their conclusions are false, we had their study reviewed by scientific professionals who critique the design of the experiment and the conclusions reached.

[Colloidal Silver: Where does it go when you drink it? How long does it stay there?](#) - This paper by [Roger Altman](#) describes a study of ingestion and elimination of colloidal silver from the human body. A fixed amount of colloidal silver was ingested each day for several months before a preliminary 24 hour silver balance was attempted by measuring the amount of silver found in feces, urine, nails, hair and perspiration. This paper details the result of the study.

[Comparing Colloidal Silver Products](#) - Discusses the rationale for comparing colloidal silver products based on the **particle surface area** of the colloid. Particle surface area is the property of a colloid that determines its effectiveness. Particle size has a direct effect on particle surface area, but in the exact opposite way from what you might expect . . . because **particle surface area increases as particle size decreases**.

[Definitions](#) - Definitions of commonly used terms pertaining to the field of colloidal science and specifically to colloidal silver.

[Effects of HCL \(Stomach Acid\) on Colloidal and Ionic Silver](#) - Ingested colloidal silver products enter the stomach and mix with the stomach acid before being absorbed in the small intestines. Stomach acid is hydrochloric acid (HCL). In order to determine how the stomach acid effects the antibacterial effectiveness of colloidal silver products we asked the scientists at [EMSL](#) to design a test protocol that would simulate the effects of stomach acid on two types of silver products, colloidal and ionic silver.

[Herxheimer Reaction](#) - The Herxheimer Reaction is a short-term (from days to a few weeks) detoxification reaction in the body. As the body detoxifies, it is not uncommon to experience flu-like symptoms including headache, joint and muscle pain, body aches, sore throat, general malaise, sweating, chills, nausea or other symptoms.

[History of The Health Support Uses of Silver](#) - For thousands of years silver has been used as a healing and anti-bacterial agent by civilizations throughout the world. Its medical, preservative and restorative powers can be traced as far back as the ancient Greek and Roman Empires. Long before the development of modern pharmaceuticals, silver was employed as a germicide and antibiotic.

**Ions, Atoms and Charged Particles** - This paper discusses the forms of silver that are found in colloidal silver, specifically, silver ions, and silver particles and the electrical charges associated with each. Many non-scientific writers confuse ions and charged particles and use the terms interchangeably when describing colloidal silver. Others refer to colloidal particles as though they are single atoms of silver. Much has been written about silver particles having a positive charge, which is false. It is no wonder then that lay people trying to learn about colloidal silver become confused and have a hard time understanding the science involved with the subject matter when so much of what they read is scientifically flawed.

**Lab Reports** - Here are laboratory reports of experiments pertaining to colloidal silver.

**The Myth of Monatomic Colloidal Silver** - *Monatomic colloidal silver* is claimed to be colloidal silver that consists of particles that are **single atoms** of silver suspended in water. This page describes that *monatomic colloids* are really ionic solutions.

**Particle Surface Area and Effectiveness** - The effectiveness of a colloid is predicated on **particle surface area**, therefore particle surface area is the single most important metric for comparing colloidal products. In the booklet "Silver Colloids" Professor Gibbs wrote "***The size of the particles in the colloidal silver suspensions we use for health purposes is very important. Particle size controls the surface area and therefore the effectiveness of the colloidal silver suspension.***"

**Partial List of Ionic Silver Products** - Here is a list of commercial products that are ionic silver.

**Partial List of Silver Protein Products** - Here is a list of products that are silver protein based products.

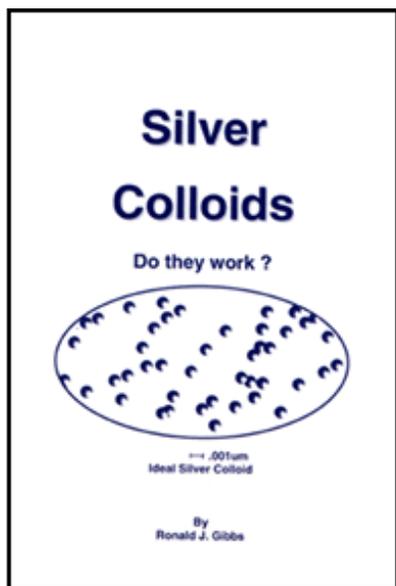
**Partial List of True Silver Colloid Products** - Here is a list of products that are true silver colloid products.

**Scanning Electron Microscope (SEM) Images of a Silver Protein Product** - These SEM images show the enormous size of silver particles found in silver protein type products.

**Silver - The Dark Side of a New Health Craze - Rebuttal** - The original article by Jonathan Campbell contained so many inaccuracies, false statements and misinformation that we asked Mr. Marshall Dudley, a recognized researcher in the field of colloidal silver to prepare a rebuttal.

**Tables and Graphs** - Here are tables of properties and graphs of various kinds.

**Technical Papers** - Here is a list of technical papers and other technical information on silver particles and solutions.



Free Booklet by Prof.  
Ronald Gibbs

### Free Booklet by Prof. Ronald Gibbs

This excellent book provides valuable information on colloidal silver and is written by an eminent scientist who until his untimely death in May 2000, was a friend and colleague. We are grateful for the contribution of this work by the estate of Ronald J. Gibbs so that it may be offered here as an educational tool.

**How to Get This Free Booklet:** This publication is available at no charge by sending a self-addressed stamped envelope at least 7" by 10" with \$1.00 of postage attached. Limit one per requester. This offer is good while supplies last. This book is currently being sold for \$8.95 on Amazon. [Address to send for book.](#)

### Download This Booklet Free:

Available in Adobe pdf format for free downloading. Click here to [Download Pdf](#)



Read more about the [colloidal silver products](#) now on the market.

### Correction to the Gibbs Booklet:

**Frequently asked question:** *Dr. Ronald Gibbs booklet states that high-quality Colloidal Silver is colorless, but the highest particle surface area colloid in the tabulations is dark in color, why this discrepancy?*

The material in Ron Gibbs book is slightly dated. Ron died in May 2000 and the book material was frozen about a year before. For example, the samples that Ron tested, some of which were made for him in the Colloidal Science Lab. Inc. (CSL) were believed by Ron to be at least 50% colloidal when in fact they were mostly ionic (typically 90%). The methods developed at CSL to determine ionic vs. particle concentration were just being developed at the time Ron wrote the book and so he was not fully informed about the ion/particle ratio of the test samples and consequently made some erroneous assumptions. Ron assumed the sample were at least 50% particles when they were only 10%.

Since true colloids of high particle concentration had not yet been developed when Ron wrote the booklet, all products of that time which displayed color were the result of large silver particles present in ionic solutions that were produced using electrolysis methods. Those products contained about 10% of the silver content in the form of particles. For a solution to display color while containing such a relatively small amount of particles requires that the particles be quite large (typically 100 - 500 nm).

True silver colloids that have a high percentage of the silver content in the form of nanometer sized particles will absorb visible light causing the apparent color to appear dark-amber or brown. It is the very high concentration of particles, not large particle size or contamination, that gives these products such color.

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## Publications

### The Truth About Colloid Particle Size

The smaller the particles in colloidal minerals, the more effective the product. As a result, many producers make claims about the small size of particles in their products, but rarely are the particles found to be as small as claimed.

### Comparing The Size Report to The Product Size Claims

Colloidal Science Laboratory (CSL) has created a variety of size reports for various silver products. When examining the Complete Size Reports and comparing the measured values of particle size to the claims made by colloidal silver producers, *it quickly becomes apparent that the size claims are greatly exaggerated.* Most ionic silver products have been found to contain particles in the 10 to 100 nm range. Silver protein products typically contain extremely large particles in the 2000 to 10,000 nm range (2 - 10 microns). The most egregious exaggerations are found among the silver protein products. *Some contain particles that are up to 1000 times larger than their producers claim.*

### Examples Of Exaggerated Particle Size Claims

In every case, the actual size of the particles is significantly different that the size claimed (ranging from 9 times larger to 829 times larger and even 1500 times larger!!!) Keeping in mind that particle size is the most significant determinant of product effectiveness, these deviations are of critical importance.

- Click here for a [Size Report](#) of a silver protein product that claims to have a *particle size of 10 nm*. Notice that the size of the majority (64%) of the particles are 8292 nm (**829 times larger than claimed**).
- Click here for a [Size Report](#) of another silver protein product claiming: *The particle size of our Colloidal Silver ranges between 0.004 and 0.107 microns, with over 75% measuring between 0.065 and 0.013 microns in diameter.* \* Notice that the size of the majority (64%) of the particles are 6185 nm (**57-1500 times larger than claimed**).
- Click here for a [Size Report](#) of an ionic silver product claiming: *Particle Size: The smaller the silver particle size (0.001-0.0005 microns or less), the more effective the product. Our silver particles are the smallest of all brands tested.* Notice that the size of the majority (93%) of the particles is 19.92 nm (**20-40 times larger than claimed**).
- Here is the [Size Report](#) of an ionic silver product claiming: *Particle size as 0.0008 micron.* Notice that the size of the majority (82.9%) of the particles is 8.23 nm (**10 times larger than claimed**).

### Why Is Particle Size Important?

Effectiveness of a colloid is predicated on the **particle surface area**. Particle size is one of the two main factors that determine the [particle surface area](#) of a colloid. Smaller particle sizes are more desirable because the smaller the particles, the greater the particle surface area. Some products contain particles that are smaller than 1 nanometer.

## How To View The Particle Size Distribution Reports

For each product that is tested and reported in the **Product Reports** section, there is a detailed laboratory analysis page that can be viewed by clicking on the product name in [the comparison table](#). At the bottom right side of the Commercial Product Report page is a link to the Complete Size Report. The size reports were generated by either of two instruments; a Zetasizer or a High Performance Particle Sizer (HPPS). The reports generated by the Zetasizer consist of two pages while the HPPS report is a single page. For Zetasizer reports, the relevant information is the Peak Analysis by Volume which is on page two. For reports generated by the HPPS, the size information is displayed in the Results section followed by a graphical size distribution plot.

The [Colloid Surface Area](#) table shows the relationship of particle surface area as a function of concentration (ppm) and particle size (nm). In order to calculate the particle surface area of a colloid, the particle size distribution must first be determined. The details of the particle size distribution is presented in the **Complete Size Report** as part of the laboratory analysis that is performed for the Product Reports published on this web site.

## About CSL Size Reports

Because the equipment required to measure colloid particle size distribution is very specialized and expensive, only certain laboratories that specialize in measuring the physical properties of colloids will be able to determine the size of the particles found in these products. The producers that sell the products do not possess the required equipment and it would seem that they count on the fact that the buying public has no way to determine the size of the particles in products they purchase. Very few laboratories can actually make such measurements. The [Colloidal Science Lab](#) (CSL) is one of only a few labs in the country that is equipped to accurately measure the particle size distribution of colloidal particles. CSL performs the lab analysis of products that are published on this web site.

## Related Information

- [How to Compare Colloidal Silver Products](#)
- [Particle Surface Area and Effectiveness](#)
- [Bioavailability of Colloidal Silver](#)
- [The Truth About Ionic Silver](#)
- [Myth of Monatomic Colloidal Silver](#)
- [The Truth About Silver Protein Products](#)
- [The Truth About TEM Images of Ionic Silver Solutions](#)
- [Bacteriology Studies of Ionic Silver are Bogus](#)
- [Bogus Scientific Claims Made for Ionic Silver Products](#)
- [Bogus Scientific Claims Made for Silver Protein Products](#)

**Colloidal Silver** - by **Lightman** - originally published in 1999 / revised 11.16.02  
all content and photos by Lightwatcher Publishing

In these days very few people have not heard of Colloidal Silver (CS) as it has attained mythic proportions through word of mouth and via the internet. CS is a simple colloidal solution of electrically produced silver ions, and tiny particles of pure silver suspended in distilled water. The germicidal, antibacterial and antiviral qualities of quality CS are well known and fully documented. Easily made at home, CS is an essential part of first aid and emergency preparedness kits in these uncertain times.

CS is also incredibly marketable and profitable, and because of this it attracted many unscrupulous individuals and companies who marketed it thoroughly, misleading their customers and ignoring established standards of quality. These 'snakeoil' salesmen were so blatant that they attracted the unwanted attention of both the FDA and the AMA.

While it is true that CS is a remarkable substance with a variety of uses, it is important that one become well informed before using or making this elixer. For this reason LW Publishing has greatly expanded this colloidal silver website, so readers can access the most current and accurate information available. Lightman has been a colloidal advocate since 1999, offering accurate information and free CS generator plans. Included are designs for four colloidal silver generator that you can construct easily at home, using inexpensive and even recycled parts. - Enjoy!

---

## **Make simple Colloidal Silver Generators**

**The original colloidal silver generator - Based upon Dr. Robert Beck's design**  
by **Lightman** - revised 11.16.02 - photos by Lightwatcher Publishing

This simple colloidal generator is based upon the original design promoted by Dr. Robert O. Becker, M.D., Author of *The Body Electric* and long time advocate of the health benefits of Colloidal Silver

A colloidal silver generator, used to make the silver solution (composed of silver ions and silver particles in pure water), is easily constructed at home from off of the shelf parts and components for less than \$20.

Silver has been used historically to treat a variety of conditions including: fungal, viral and bacterial infections and burns. Scientific studies from the late 1800's to the present have documented this simple elixer. Colloidal silver solution works by interfering with the respiration of pathogenic organisms.

Colloidal silver solution can be used both topically and internally; by drinking, applying to the skin, atomizer inhalation, or swishing under the tongue (sublingually).

When used as a mineral supplement, colloidal silver solution "reportedly" bolsters the immune system while dispatching single celled organisms. Because this solution is 100% lethal to pathogens, it does not create resistant varieties like antibiotics. Applied to burns it accelerates healing and new cell growth.

Colloidal silver is not supported by mainstream medicine within the U.S., as it competes directly with commercial antibiotics. The suppression of this information is a major priority for the AMA and pharmaceutical companies. If you want to learn more about this, access the following links.

## **Making the Colloidal Silver Generator**

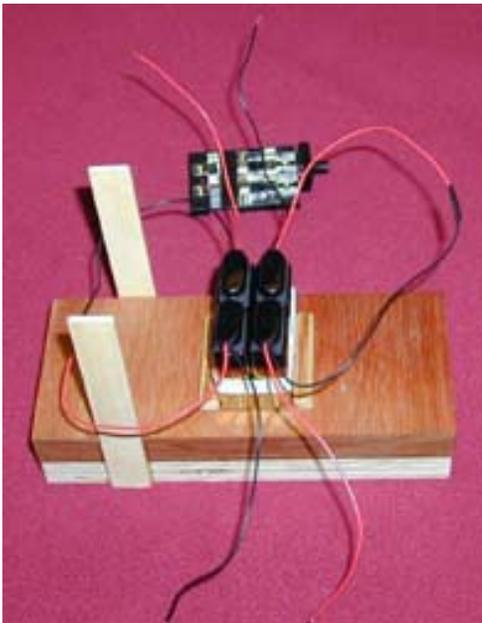
### **Supplies You will need to make the colloidal silver solution:**



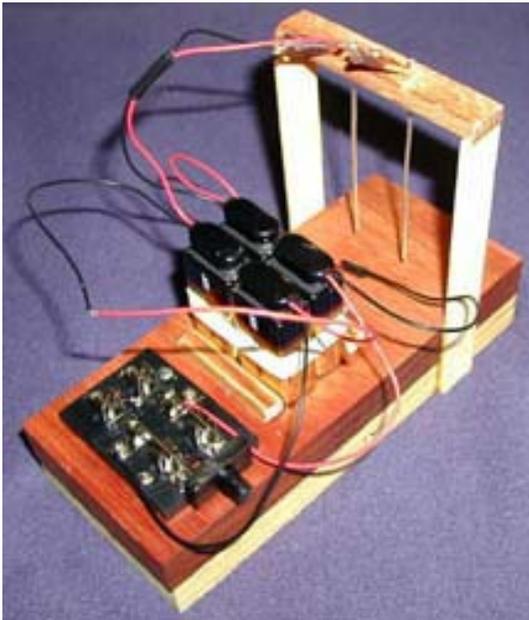
- three or four 9V batteries
- three or four battery caps with wire leads (from Radio shack)
- distilled water, glass tumbler, dark glass bottle with cap for storing the solution
- 3" wires or bars of 99.99% pure silver
- wood or plastic stir stick
- thick rubber band, wood glue
- two small alligator clips, from Radio Shack
- small button toggle switch, from Radio Shack
- small wooden base (4" x 8" or so)
- multi tool or swiss army knife (to cut and saw with)
- thin wooden strips (for frame to hold the silver wires).
- optional: small flashlight bulb and socket\*

### **Making the Generator**

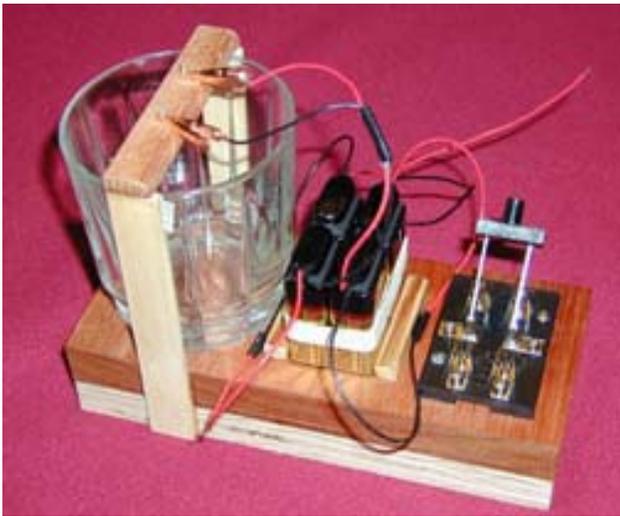
1. Put rubber band around batteries to secure them
2. Attach battery leads to tops of batteries
3. Connect wires red-to-black and black-to-red, twisting exposed wire tips together, leaving two pair of wire ends apart at ends of battery pack.



4. Attach 2 alligator clips to wire ends (one red and one black)
5. Attach other pair of open wire ends to switch.
6. Mount assembly onto wooden base with tumbler, batteries and switch. Glue on wooden support strips to hold wires. Screw down switch.



7. Attach alligator clips to PURE silver wires or bars.
8. Fill tumbler with distilled water
9. Throw switch, muttering "It's alive... it's alive" like Doctor Frankenstein



10. Time the process for 20-30 minutes, stirring every minute or so. This increases the production of silver colloids and reduces scale and black silver crystals (which should be strained out later using an unbleached coffee filter).

Bubbles will start to form after a few minutes on one pole, then a light mist will exude from the other pole. A flashlight beam helps to see this. Stir this solution frequently with a plastic or wood chopstick.

Store the bottle in a cool, dark place. Will keep for several months.

The usual dosage of this "mineral supplement" is 1-2 tablespoons twice per day. It is best to swish it around the mouth and/or gargle the solution before swallowing. This allows many silver ions to be absorbed through the mucus membranes (sublingual).

Many sources claim protection from air or water-borne viruses and pathogens when colloidal silver is used daily. When flu or headcolds threaten, some sources recommend increasing dosage to two ounces, twice a day. It takes 5-7 days for full protection to take effect.

Extended usage of colloidal silver is not recommended. But adding colloidal silver to your daily diet during times of bacterial or viral threats makes sense.

\*An online reader suggested that a small lightbulb be added inline as a safety feature, and to show when contact is being accidentally made.

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### **To get pure silver:**

Canadian Maple Leaf coins - from any coin seller two one ounce bars of 99.99% pure silver [click here](#)

The best source I have found for 99.99% thick pure silver wire is through [www.atlasnova.com](http://www.atlasnova.com)  
Buy it for \$12 an ounce and pay only \$5 for shipping and handling no matter how much is bought.  
to email Atlas Nova - [click here](#)

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## Warnings/ AMA disclaimer

This device is meant to produce colloidal silver solution, which is a "mineral supplement". We make no claims about it as an antibiotic or as a curative agent.

- Some individuals report disruption of friendly flora and fauna after ingesting colloidal silver. For those who are gastrically sensitive to colloidal silver; handbooks recommend gargling colloidal the solution without swallowing, to protect friendly intestinal bacteria (many silver ions are absorbed through mucus membranes of the mouth during gargling). The eating of organic yogurt is sometimes recommended to replace friendly intestinal bacteria

- High dosages of colloidal silver over an extended period of time are not recommended, as these can cause the buildup of silver residue in the joints, gums and eye whites. But when we consider the dreadful toxicity and side effects of pharmaceutical antibiotics, colloidal silver's side effects are minor by comparison.

Live long and prosper!

**Lightman**

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**Classic Design**

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[CS Docs and Links](#)



# Silvermithing Supplies

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[Half-Round Wire](#)  
[Triangle Wire](#)

[Square Wire](#)  
[Low-Dome Wire](#)  
[Bezel/Strip Wire](#)

[.999 Wire](#)  
[.9999 Wire](#)  
[Silver Sheet](#)

[Silver Solder](#)  
[Silver Casting Grain](#)  
[Silver Scrap](#)

## .9999 Superfine Round Silver Wire (99.99% Pure Silver) - Dead Soft

- D = DIAMETER in INCHES (ROUND WIRE)
- Wire is sold by the FOOT

Item	Gauge	D (inch)	
SFW12a - .9999 Fine Round Wire - \$8.00/ft	12	.081"	ft
SFW14a - .9999 Fine Round Wire - \$6.00/ft	14	.064"	ft
SFW16a - .9999 Fine Round Wire - \$5.00/ft	16	.051"	ft
SFW22a - .9999 Fine Round Wire - \$1.85/ft	22	.025"	ft

\*The shopping cart will sum the total length as you add to the cart. Example: To order 70 ft of 12 ga wire, add a length of 50 ft to the cart, and then a length of 20 ft to the cart.

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