

Section J

Colloidal Gold

Subsection 8

Name of Procedure:

Colloidal Gold

Suggested Uses:

Colloidal Gold is a wet metal deposition process which may be used on non-porous items and on certain porous items.

Equipment Needed to Perform Procedures:

- A - Protective clothing and rubber gloves
- B - Face shield visor and/or safety goggles
- C - Magnetic stirrer, magnetic follower and magnetic retriever
- D - Glass beakers
- E - Measuring cylinders
- F - Hot plate/heater
- G - pH strips and/or pH meter
- H - Refrigerator
- I - Orbital shaker
- J - Camera (35 mm, 2 1/4, MP-4, CU5, TC III)
- K - Fume hoods

Chemicals Needed For Preparation of Chemical Solution(s):

- A - One (1) gram of Gold Chloride
- B -One (1) gram of Sodium Citrate
- C - Ninety-six (96) grams of Citric Acid
- D - Fifteen (15) ml of Polyoxyethylenesorbitan Monolaurate Tween 20

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Formula/Directions for Preparation of Chemical Solution(s):

Gold Chloride is mixed in three (3) stock solutions and a working solution which must be prepared with the instructions strictly adhered to:

Gold Stock Solution:

1. Place one (1) gram of Gold Chloride in a large glass beaker with magnetic stirrer.
2. Add ten (10) ml of distilled water to the solution and stir until the Gold Chloride is completely dissolved.
3. Place the solution in a dark container until needed.

Sodium Citrate Stock solution:

1. Place one (1) gram of Sodium Citrate in a large glass beaker with the magnetic stirrer.
2. Add one-hundred (100) ml of distilled water to the solution and stir until the Sodium Citrate is completely dissolved.
3. Place the solution in a dark container until needed.

Citric Acid Stock Solution:

1. Place ninety-six (96) grams of Citric Acid in a large glass beaker with magnetic stirrer.
2. Add one-thousand (1000) ml of distilled water to the solution and stir until the Citric Acid is completely dissolved.
3. Place the solution in a dark container until needed.

Working Solution:

Note: The mixing instructions of the working solution will vary to a certain degree and should be followed as strict as possible:

1. Place three (3) ml of Colloidal Gold Stock solution in a large beaker.

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2. Add two (2) liters of distilled water to the stock solution.
3. Place the solution on a hot plate/heater and bring to a boil.
4. Once the solution begins to boil, add thirty (30) ml of the Sodium Citrate stock solution and lightly boil for approximately fifteen (15) minutes.
5. Remove the solution from the heat and allow the boiling to completely stop.
6. Allow the working solution to cool to room temperature.
7. After the solution has cooled to room temperature, measure the pH. (The pH must be approximately 3. If the pH is higher than this, add the Citrate Acid stock solution, five [5] ml at a time and continue checking until the desired reading of approximately 3 is reached).

Note: Store the working solution in a refrigerator. Once the solution is removed from the refrigerator it must reach room temperature prior to use.

Processing Procedures for Application to Item(s) of Evidence:

- A. Place the item of evidence in a container of distilled water. The container must be sufficient to completely submerge the item for thirty (30) to forty-five (45) minutes.
- B. Place the item of evidence in a container of the Gold Chloride stock solution on an orbital shaker and leave on a slow shake for an additional thirty (30) to forty-five (45) minutes.
- C. Remove the item of evidence from the solution and allow to complete air dry (A heated-air gun or hair dryer may be used to expedite the process).

Note: This process should be followed with the Modified Physical Developer technique to develop any additional latent impressions.

Steps to Preserve Developed Impressions:

The most appropriate methods in preserving developed impressions is through photography, using the appropriate techniques (See Photographic Equipment/Procedures), and electronic recording (See Image Processing).

Safety Concerns:

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Presently there are no major safety concerns associated with the use of this technique if used properly.

Storage and Location of Chemicals and Solutions:

The Colloidal Gold, Sodium Citrate and Citrate Acid reagents should be stored in their original shipping containers until needed.

All stock solutions should be stored in dark shatterproof containers.

The working solution must be stored in a dark container and refrigerated until needed.

Shelf Life:

The Colloidal Gold, Sodium Citrate and Citrate Acid reagents - Indefinite

All stock solutions - Indefinite.

The working solution - thirty days if stored properly (If a heavy precipitate is noticed in the bottom of the container, the solution should be discarded.).

Other Information:

Items of evidence should be processed with superglue, powders and/or florescent dyes prior to utilizing this technique.