Section J - Subsection 10 Modified Physical Developer Page 38

Name of Procedure:

Modified Physical Developer

Suggested Uses:

Modified Physical Developer is a technique which may be utilized to develop latent impressions on non-porous items and as a follow up process to Colloidal Gold. When this technique is used in conjunction with Colloidal Gold it is referred to as "Multi-metal Deposition." This process is normally used on non-porous or semi-porous items, but may also be used on some porous materials.

Equipment Needed to Perform Procedures:

A - Protective clothing and rubber gloves

B - Magnetic stirrer, magnetic follower and magnetic retriever

C - Glass beakers

D - Four (4) glass trays

E - One (1) dark shatterproof container (one [1] gallon)

F - Glass measuring cylinders

G - Forceps (type which will not leave indented impressions)

H - Camera (35 mm, 2 1/4, MP-4, CU5, TC III)

Chemicals Needed For Preparation of Chemical Solution(s):

A - Eighty-nine (89) grams of Ammonium Ferrous Sulphate

B - Twenty-two (22) grams of Citric Acid

C - Thirty-three (33) grams of Ferric Nitrate

D - One (1) ml of Polyoxyethylenesorbitan Monolaurate Tween 20

E - Two-hundred (200) grams of Silver Nitrate

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

The glassware utilized in this technique must be thoroughly cleaned. Wipe all internal surfaces of the beakers with paper towels under cold tap water and rinse three (3) times with distilled water before use. After completion of all processes, wash beakers and trays with tap water and dry with a clean cloth or paper tissue. Stubborn stains may be removed with a mild detergent (never use an abrasive cleaner) and rinse with cold tap water for ten (10) minutes to remove detergent.

The Modified Physical Developer is prepared in three (3) solutions with a final rinse of distilled water.

Solution A:

1. Place one-thousand (1000) ml of distilled water in a clean two-thousand (2000) ml glass beaker with a magnetic stirrer.

2. Add thirty-three (33) grams of Ferric Nitrate, eighty-nine (89) grams of Ferrous Ammonium Sulfate, twenty-two (22) grams of Citric Acid and one-thousand (1000) ml of Polyoxyethylenesorbitan Monolaurate Tween 20. Stir until the solution is thoroughly dissolved.

3. Transfer the solution to a clean dark shatterproof container until needed.

Solution B:

1. Place one-thousand (1000) ml of distilled water in a clean two-thousand (2000) ml glass beaker with a magnetic stirrer.

2. Add two-hundred (200) ml of Silver Nitrate to the distilled water. Stir until the silver nitrate is thoroughly dissolved.

3. Transfer the solution to a clean dark shatterproof container until needed.

Working Solutions:

1. Combine solution A and solution B. The working solution should be mixed no more than fifteen (15) minutes prior to use.
2. Place the working solution in the glass processing tray for application to the items of evidence.

Note: Avoid mixing and/or applying the solutions in the presence of florescent lighting.

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

After the application of the Colloidal Gold process and the item has been allowed to air dry, examine the item for the presence of latent impressions and photograph any developed impressions.

1. Place the item(s) in a glass tray of the working solution for a few minutes. Development of impressions will normally occur rapidly.

2. Place the item(s) in a glass tray of distilled water for approximately five (5) minute.

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).

In some cases the photographic contrast of developed impressions may be improved by Florescent Examination. The background material may fluoresce and the developed impressions will absorb the illuminating light creating a negative image which will assist in the preservation of the impression.

Safety Concerns:

Silver Nitrate and any solutions containing Silver Nitrate are corrosive and toxic and therefore, should be handled with extreme care. Always wear rubber gloves and avoid ingestion or inhalation. The solutions will stain clothing and skin and will appear as black in color and remain on skin for several hours after contact. Protective gloves, eye goggles and protective clothing should be worn at all times.

Storage and Location of Chemicals and Solutions:

Ammonium Ferrous Sulphate, Citric Acid, Ferric Nitrate, Silver Nitrate and Polyoxyethylenesorbitan Monolaurate Tween 20 should be stored in their original shipping containers until needed.

Working solutions should only be mixed for immediate use.

Solutions A and B should be stored in dark shatterproof containers.

Shelf Life:

Polyoxyethylenesorbitan Monolaurate Tween 20, Ammonium Ferrous Sulphate, Citric Acid, Ferric Nitrate, and Silver Nitrate - Indefinite if stored properly.

Working solution - immediate use only.

Solution A - Indefinite.

Solution B - Up to six (6) months

Other Information:

Careful preparation of Modified Physical Developer is essential with all measurements as exact as possible and glassware as clean as possible.

Long development times will indicate that the Silver Nitrate concentration has weakened and the solution(s) should be discarded and new solutions mixed. If new solutions are mixed, be sure to thoroughly clean the trays and beakers prior to using the new solutions.

Solutions used on item(s) should be discarded.

Plastic forceps without serrated edges should be used to handle or transfer item(s) from tray to tray.

Care should be taken when processing as unnecessary creasing or rough edges on items may cause unwanted deposits of Silver.

Colloidal Gold and Modified Physical Developer cannot be used prior to ninhydrin or one of the ninhydrin analogs in the sequence of processing.