



<b>ATF-LS-LP18</b> <b>Silver Nitrate</b>	Published Online: <b>March 2018</b>
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I. **Scope:** Silver nitrate reacts with sodium and potassium chloride in palmar sweat to form silver chloride, a compound more photosensitive than silver nitrate. With certain surfaces, such as raw or unfinished wood and wax impregnated papers silver nitrate is one of the most effective processing techniques available. **However**, this procedure is particularly destructive in both general chemical reaction and the amount of water immersion required. Silver nitrate does not yield consistently high success on porous items, is expensive, and prohibits effective laser examinations and therefore should be avoided when processing routine paper or porous items.

II. **References:**

Lee, Henry C.,; Gaensslen, R.E., eds. *Advances in Fingerprint Technology*; Elsevier Science Publishers: NY, 1991.

Kent, Terry, ed. *Fingerprint Development Techniques*; Heanor Gate Publisher: Derbyshire, England, 1993.

Olson, Robert. *Scott's Fingerprint Mechanics*; Charles C. Thomas Publisher: Springfield, IL, 1978.

III. **Apparatus/Reagents:**

Concentrations of silver nitrate solutions vary from 1 to 10%, with 3% acceptable for most processing and higher concentrations for wood items. Three separate preparations of silver nitrate are available depending on the substrate to be processed. Aqueous silver nitrate solutions are adequate for wood items. Alcohol based solutions are preferred for wax impregnated papers. Silver nitrate solutions should be prepared in small amounts according to immediate need. Silver nitrate is a white crystalline substance that must be stored in dark containers. Working solutions are light sensitive as well and should not be stored for future use.

**Preparations**

Raw wood

1. Mix 5.0 grams of silver nitrate in 100 milliliters of distilled water and stir until the crystals are completely dissolved.
2. Add 1 milliliter of glacial acetic acid and completely mix.

Wax Impregnated Papers

1. Mix 3.0 grams of silver nitrate in 10 milliliters of distilled water and stir until the crystals are completely dissolved.
2. Add 90 milliliters of ethanol and 1 milliliter of glacial acetic acid and mix completely.

Flare/dynamite wrapper type papers

1. Dissolve completely 6 grams of silver nitrate in 10 milliliters of distilled water and add 100 milliliters of ethanol.
2. Dissolve completely 6 grams of silver nitrate in 10 milliliters of distilled water and add 100 milliliters of methanol.
3. Dissolve completely 6 grams of silver nitrate in 10 milliliters of distilled water and add 100 milliliters of isopropanol.
4. The ethanol solution (step1 above), is then mixed with the methanol solution (step 2 above) and

then mixed the isopropanol solution (step 3 above).

- IV. Safety Precautions:** This procedure involves the use of hazardous materials. This procedure does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution should be exercised and the use of personal protective equipment should be utilized to avoid exposure to dangerous chemicals. Consult the appropriate MSDS for each chemical prior to use.
- V. Procedures:**
1. Apply the appropriate silver nitrate solution to the item of evidence by immersing, brushing, swabbing or thoroughly spraying.
  2. Blot the item dry, making sure to remove excessive liquid (the item should be completely dry before moving to the next step).
  3. Expose the item to light from a photo flood or U.V. light source. Sunlight may be used, but care must be exercised to control exposure as the silver halide may develop too rapidly.
  4. Silver chloride impressions will darken and when less than optimum intensity is reached the item must be removed from the light source.
  5. Record any developed impressions taking care not to overexpose the item to light which would continue to darken to impression or substrate.
- VI. Quality Assurance/Quality Control:** Documentation of control testing of working solutions of silver nitrate shall be made using the appropriate reagent log. Test solution by placing test impressions on a paper test strip and expose to working solution as described above. If the test prints are visualized, the solution is working properly.