3.8.1 Scope

Ninhydrin (triketohydrindene hydrate) is used to develop latent prints on porous surfaces such as paper, cardboard, and unfinished wood. Latent prints in blood on porous items may also be enhanced with ninhydrin. Ninhydrin reacts with amino acids present in latent print residue and produces a purple color change known as Ruhemann's Purple. Ninhydrin may either utilize acetone or petroleum ether as the carrier. Petroleum ether base ninhydrin aids in protecting and preserving inked writings and markings. Heat and humidity may be applied to accelerate the ninhydrin reaction.

3.8.2 Evidence

Any porous item including paper, cardboard, or unfinished wood.

3.8.3 Safety Precautions/Limitations

Use only in fume hood.

Wear safety glasses/goggles.

Handle with rubber gloves (Nitrile preferred).

Wear lab coat or protective clothing.

Keep away from open flame, heat, or sparks.

Avoid contact with skin (both crystals and liquid).

Ninhydrin in which acetone is used as the carrier may cause some inks to run; therefore, clear copies of all documents should be made before processing with acetone based ninhydrin.

Too high of a concentration of ninhydrin can hinder the development of the Ruhemann's purple color change.

3.8.4 Chemicals/Reagents

3.8.4.1 Acetone base
1. Ninhydrin crystals
2. Acetone

3.8.4.2 Petroleum ether base
1. Ninhydrin crystals
2. Methanol
3. 2-Propanol (or Isopropyl Alcohol)
4. Petroleum ether (or pentane)

3.8.5 Instruments/Equipment

Balance
Beakers
Graduated cylinders
Magnetic stirrer
Stirring magnet
Dark storage bottles
Aspirating flask, glass bowl or tray, or brush (camel hair or stiff bristle)
Compressed air
Steam iron
Humidity chamber

3.8.6 Preparation

3.8.6.1 Acetone base

1. Dissolve 5 g of ninhydrin crystals into 1000 ml of acetone.
2. Mix in glass beaker using magnetic stirrer until ninhydrin crystals are dissolved.

3.8.6.2 Petroleum ether base

1. Dissolve 5 g of ninhydrin crystals into 30ml of methanol.
2. Add 40 ml of isopropyl alcohol to mix and stir.
3. Add 930 ml of petroleum ether to mix and stir.

3.8.6.3 Storage

Dark storage bottles.

3.8.6.4 Shelf Life

No expiration date is provided; however, a control will be performed prior to use on evidence.

3.8.7 Controls

One or more latent prints shall be applied to a porous non-evidence item and then processed with ninhydrin to ensure the reagent is working properly.

A positive result is achieved by a purple color change and ridge detail development.

A negative result occurs when no ridge detail develops.

A control must be performed each time ninhydrin is prepared and documented in the Reagent Logbook.

A control must be successfully performed before applying ninhydrin to evidence. This control must be documented in the Reagent Logbook as well as the examiner's notes.

If at any time a control test indicates that the reagent is not working properly, the examiner or technician performing the control will properly dispose of the reagent, make a new reagent, and test a new control. Once the control tests appropriately, the reagent may be used.

In some circumstances of a failed control test it may be necessary to review each component of the reagent/solution to ensure no deficiencies exist in that lot number. If a deficiency is discovered, the preparer will properly dispose of that lot number and document the deficiency and disposal in the Chemical Log. A different lot shall then be used to make the reagent.

3.8.8 Procedure

1. Photocopy or photograph documents.
2. To apply, use aspirating flask and spray both sides of document with ninhydrin solution, dip into tray or bowl of ninhydrin solution soaking paper for a few seconds, or brush ninhydrin solution onto the item using a camel hair or stiff bristle brush.
3. Air dry in hood.
4. A. With steam iron, add heat and moisture. Keep iron about one inch from paper.

or

B. Put paper in humidity chamber. The humidity chamber should be set at 80°C and 65% humidity.

5. Observe progress of development. Further development may occur over time (see 3.8.9).
6. Examine evidence to determine if any ridge detail is present.
7. Photocopy or photograph documents after processing.

3.8.8.1 Deviation from Protocol

A variation in the above procedure may be performed with supervisor approval.

3.8.9 Interpretation of Results

Latent prints of comparable value shall be marked and photographed with a ruler included or digitally scanned as soon as possible, preferably within the same day. Refer to 2.5.2 and 2.5.5 of the Forensic Imaging Standard Operating Procedures Manual for further instruction.

Re-examine evidence after 24 hours. Mark and photograph any additional areas developed. A second, qualified Latent Print Examiner should also review the evidence after this time period.

3.8.10 References

CBDIAI. "Ninhydrin." Retrieved from http://www.cbdiai.org/Reagents/nin.html

Federal Bureau of Investigation. Revised 2000. "Ninhydrin (Acetone Base)." Processing Guide for Developing Latent Prints. Federal Bureau of Investigation, Washington, D.C., p. 56.

Federal Bureau of Investigation. Revised 2000. "Ninhydrin (Petroleum Ether Base)." Processing Guide for Developing Latent Prints. Federal Bureau of Investigation, Washington, D.C., p. 33.

Federal Bureau of Investigation. Revised 2001. "Ninhydrin (Acetone Base)." Processing Guide for Developing Latent Prints. Federal Bureau of Investigation, Washington, D.C., p. 83.

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