SIRCHIE®
PRODUCTS ▪ VEHICLES ▪ TRAINING

TECHNICAL INFORMATION

Ninhydrin Crystals

Catalog Nos. NRP01A, NRP02B, NRP03C

Application	Development of latent fingerprints on porous surfaces such as paper, cardboard and raw wood *(when applied in a solution)*.

INFORMATION

Ninhydrin (1,2,3-triketo-hydrindene hydrate) was developed originally to detect ammonia or primary and secondary amines such as amino acids. Amino acids are the basic structural units of proteins and human perspiration contains small amounts of this material. Amino acids are known to form a permanent bond with materials containing cellulose; thus, when an individual touches a piece of paper, amino acids conforming to the ridge structure of the fingertips are sloughed off. When a formula of Ninhydrin is applied to the paper it reacts with these free amines, evolving a deep blue or purple color known as Ruhemann's purple.

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Hazards/Safety Info	**Warning!** Some of the chemicals used in the following solutions are extremely hazardous. Wear splash-proof goggles, latex or nitrile gloves, synthetic apron and a vapor respirator. **Warning!** If any chemical listed below is swallowed seek immediate medical attention. If any of these chemicals come into contact with the skin or eyes, immediately flush with water. Avoid breathing vapors. **Warning!** Solvents used in making these solutions are flammable. Do not mix or use in the presence of an open flame or ignition source. Prior to using any SIRCHIE products mentioned, consult the appropriate Material Safety Data Sheets (MSDS) found on our website at www.sirchie.com/support. Consult respective manufacturers for non-SIRCHIE product MSDS.
Tools Required **Optional:** • Zinc chloride • Methyl-tert-butylether (MTBE) • Glacial acetic acid • Acetone	**Required:** • Ninhydrin Crystals • Isopropyl alcohol • 3M NOVEC®* Engineered Fluid HFE7100 (or petroleum ether) • Methanol • Glass measuring cup in ml increments • Beakers capable of holding at least 1.5 liters liquid volume • Magnetic stirring plate with magnetic stirrer • Glass stirring rods • Chemical-resistant funnel • 1000ml brown glass bottles with sealable caps **3M NOVEC® is the registered trademark of the 3M Company*

PREPARATION INSTRUCTIONS

Working Solution

Prepare a working solution by mixing and adding the following ingredients to a 1-liter (1000ml) brown glass container with a sealable lid.

Solution	Volume
Ninhydrin	5g
Methanol	30ml
Isopropanol	40ml
Petroleum Ether	930ml

Dissolve 5g of Ninhydrin Crystals in a glass beaker or container with the methanol on a laboratory magnetic stirrer or by manually stirring with a glass rod (continue until crystals are fully dissolved). Add to brown glass container, and then add Isopropanol. Complete the formulation by adding the petroleum ether. *—Shelf Life: 12 months*

Special Note: 3M NOVEC® HFE7100 may be substituted for the 930ml of petroleum ether. HFE7100 NOVEC is available from SIRCHIE by specifying No. NS7100. SIRCHIE recommends using HFE7100 for improved safety during storage and usage.

Alternative Working Solution *(Simplest)*

Warning! This solution is highly flammable.

Solution	Volume
Ninhydrin	5g
Acetone	800ml

Dissolve 5g of Ninhydrin Crystals in 100ml of acetone in a glass beaker or container on a laboratory stirring plate or by manually stirring with a glass rod. Once fully dissolved add to 1000ml brown

glass container and add remaining 700ml acetone to container. Place sealable cap on bottle. —*Shelf Life: 90 days*

Special Note: This formula is known to cause most commercial inks to run.

APPLICATION INSTRUCTIONS

Best Known Method

For documents and other small porous items, tray development is recommended. Using tweezers, immerse the item into whichever working solution is used. In a few seconds remove the item and let excess solution run back into the tray. Allow the item to dry fully before applying other processes such as steam or fixatives such as No. NFS100 Ninhydrin Fixative.

RESULTANT PRINT

The working solution may also be applied using a spray method. Spray the document until it is fully saturated, and then turn the document over and spray until saturated.

Caution! Spraying should be done in a well ventilated area or a laboratory fume hood.

Results Expected: See photograph of resultant print shown to the right.

Alternative Method

If it is essential to rapidly view prints rather than waiting 24-48 hours, development of prints may be accelerated by the application of moist heat. The simplest method of doing this is to place the treated and dried document on a cotton towel, and then cover it completely with a second towel. Using a steam iron set for low steam, place the iron in contact with the top towel and iron back and forth over the towel.

Special Note: Use only distilled or deionized water in the iron.

AFTER TREATMENT (1)

Ninhydrin-developed prints may fade with time so it is important that they be photographed as quickly as possible.

Caution! Be certain to include a scale in all photos.

Ninhydrin prints may be fixed to prevent fading. After photographing the prints, apply Ninhydrin Fixative (No. NFS200) to the document according to the instructions that accompany the product.

Note: Only use Iodine fuming development methods prior to applying any Ninhydrin or a DFO formulation. Ninhydrin use will not interfere with subsequent treatments of Silver Nitrate (No. 205C), Silver Latent Print Spray (No. SLPS300) or Physical Developer (No. LPD100).

AFTER TREATMENT (2)

Weak Ninhydrin prints may be enhanced (made fluorescent) by using the following treatment:

Working Solution *(Zinc Chloride)*

Prepare a working solution by mixing and adding the following ingredients to a 1-liter (1000ml) brown glass container with a sealable lid.

Solution	Volume
Methyl-tert-butylether (MTBE)	500ml
Zinc Chloride	30g
Glacial Acetic Acid	10ml
Petroleum Ether	490ml

Dissolve 30g of zinc chloride in a glass beaker or container with the MTBE on a laboratory magnetic stirrer or by manually stirring with a glass rod. (Continue until crystals are fully dissolved.) Add to brown glass container, and then add glacial acetic acid. Complete the formulation by adding the petroleum ether.

Application Method:
Following Ninhydrin treatment of the item, and after it is fully dry, spray the zinc chloride after treatment lightly onto the item and air dry. Process and dry it a second time. After drying, oven-bake the item at 80-100°F at 65% humidity for 20 minutes. View under a forensic light source at 450nm to 460nm. Use an orange barrier filter.

INTERPRETATION INSTRUCTIONS

Once treatment is complete as outlined above examine the document for any possible latent prints. As mentioned above, development times will vary. If the moist heat method was used prints will be clearly visible in minutes and they should be photographed. Store treated documents in individual evidence containers or envelopes (No. TVK100). Store in a cool, dark place.

POSSIBLE REASONS FOR POOR OR NO RESULTS

1. No developed latent prints are present.
   - 1.1. Insufficient development time. Allow up to 48 hours and if no prints appear, retreat the item.
   - 1.2. There were no amino acids present. Try Silver Nitrate (205C) or Physical Developer (LPD101).
   - 1.3. Check the expiration date of the chemical used. If it is out of date retreat the item with a fresh solution.

OTHER SIMILAR PRODUCTS

SIRCHIE manufactures three pre-mixed Ninhydrin formulations: Ninhydrin Spray (No. 201C/202C), Ninhydrin with Acetone (No. 201ACE) and Special Formula Ninhydrin (NSI609).

1,8-Diazafluoren-9-One or DFO (No. DFS200P) is a Ninhydrin analog and will develop latent prints on porous surfaces. On occasion, the developed prints will be light pink in color but prints fluoresce brightly under alternate light sources or UV light.

1,2-Indanedione (No. LV508) is the result of a low cost substitute for DFO. It too produces fluorescence under alternate light sources (450-460nm).

References

1. Chesapeake Bay Division, International Association for Identification, **"Ninhydrin",** ***Reagents,*** <http://www.cbdiai.org/Reagents/nin.html>, January 21, 2009.
2. Arizona, Univ. of, "The Chemistry of Amino Acids," The Biology Project, Dept. of Biochemistry and Molecular Biophysics, <www.biology.arizona.edu/biochemistry/problem_sets/aa/aa.html> January 15, 2009.
3. Saferstein, Richard, Ph.D., Criminalistics, Page 453. New Jersey: Prentice Hall; 1998.

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