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Name of Procedure:

TEC (Thenoyl Europium Chelate)

Suggested Uses:

TEC is a fluorescent dye which can be used in conjunction with a laser or alternate light source to develop latent impressions on non-porous items of evidence. This technique involves staining the cyanoacrylate developed impressions and utilizing the UV spectrum, particularly the long wave, to record the latent impressions.

Equipment Needed to Perform Procedures:

A - Crimescope Alternate Light Source or UV light source

B - Laser Goggles

C - Filter (Laser)

D - Camera (35mm, 2 1/4, MP-4, CU5)

E - Fume hood

F - Rubber gloves and apron

G - Face shield visor and/or safety goggles

H - Plastic applicators with spouts or glass tray for submerging items

I - Processing Trays

Chemicals Needed For Preparation of Chemical Solution(s):

A - One (1) gram of Thenoyltrifluoroacetone

B - Three-hundred eighty (380) ml of Methyl ethyl ketone

C - 0.5 gram of Europium chloride hexahydrate

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

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The TEC solution are mixed in two (2) solutions: a stock and a working solution. The stock solution consists of two (2) parts.

Stock Solution A:

1. Place one (1) gram of Thenoyltrifluoroacetone in a beaker with a magnetic stirrer.
2. Add two-hundred (200) ml of Methyl ethyl ketone and stir until the completely dissolved.
3. Place the solution in a clearly marked dark shatterproof container until needed.

Stock Solution B:

1. Place 0.5 gram of Europium chloride hexahydrate in a beaker with a magnetic stirrer.
2. Add eight-hundred (800) ml of Distilled water and stir until completely dissolved.
3. Place the solution in a clearly marked dark shatterproof container until needed.

Combine stock solutions A and B in a large beaker and continue to stir the solution for fifteen (15) to thirty (30) minutes. The stock solutions should not be mixed together until needed for preparation of the working solution.

Note: A sealed container should be used during the stirring process as the methyl ethyl ketone will evaporate quickly.

Working Solutions:

1. Place one-hundred (100) ml of the combined stock solution in a large beaker with a magnetic stirrer.
2. Add one-hundred eighty (180) ml of methyl ethyl ketone and seven-hundred twenty (720) ml of distilled water to the solution with continual stirring for fifteen (15) minutes in a sealed container.
3. Once the solution is thoroughly mixed, place the solution in a clearly marked spray bottle or dark shatterproof container until needed.

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

The first (critical) step is to super glue the item of evidence (SEE - Cyanoacrylate ester process). This process will not only develop many latent prints, but more importantly (for the laser process) will adhere to the most minute of fingerprint residue not visible to the naked eye. The process will virtually “set” the latent print in place. Once this procedure is completed, the TEC solution can be applied.

There are two methods which an item of evidence may be processed with TEC:

Submersion Method:

1. Utilizing a fume hood and rubber gloves, spray or completely submerge the item of evidence in the TEC solution for approximately two (2) minutes and allow to dry.
2. When completely dry, view the item using either the Crimescope Alternate light source in the UV spectrum or use the UV light source.

Squirt Bottle Method:

1. While utilizing the Crimescope alternate light source or UV light source, slowly apply the solution with the squirt bottle.
2. Continue to apply the solution until the impressions develop with the proper contrast noted.

Note: This dye will preferentially adhere to the super glued print, but a certain amount will adhere to the item itself. If too much dye is used, the entire surface will fluoresce and mask the latent print. In this case, simply rinse the item with a solution of eight-hundred (800) ml of methanol and two-hundred (200) ml of distilled water. The excess dye will wash away and in most cases the dye adhering to the latent print will remain.

Steps to Preserve Developed Impressions:

The most appropriate methods to preserve developed impressions is through photography, using the proper techniques (See Photographic Equipment/Procedures) and/or electronically recording

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the impressions (See Image Processing). The utilization of a 35 mm, 2 1/4, MP-4, or CU5 camera will suffice for TEC developed prints because the fluorescence will be so intense. However, all laser prints must be photographed using a laser filter; otherwise, they will not be recorded on the film.

Safety Concerns:

Presently the safety concerns have not been thoroughly investigated in respect to the use of this chemical and there are varied opinions on the associated health effects. This chemical solution should be applied and treated with extreme care until the full health effects are known. As with any chemical it may cause some irritation when in contact with the eyes or skin and may be harmful if inhaled or ingested.

Storage and Location of Chemicals and Solutions:

The Thenoyltrifluoroacetone and Europium chloride hexahydrate reagents should be stored in the original shipping container until needed.

The Methyl ethyl ketone should be stored in the original shipping containers or in a flammable liquid storage area until needed.

Shelf Life:

Thenoyltrifluoroacetone and Europium chloride hexahydrate reagents - Indefinite

Stock solutions - Ninety (90) days

Working Solution - Ninety (90) days

Other Information:

TEC may be used in conjunction with other fluorescent dyes which may be available.

This procedure is not recommended at this time for use on items which may be transferred to other laboratory sections until the health effects are thoroughly investigated.